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Green Zia Environmental Excellence Program

Dry Cleaning

Guidance for improved environmental performance and pollution prevention in your dry cleaning business

Acknowledgements

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Guidance materials for dry cleaning

Introduction

This packet contains information on how to establish a pollution prevention program specific for a dry cleaning operation. The packet also contains waste management and regulatory guidance materials to help assure that you are in compliance with environmental, health, and safety regulations. Used together, this information can help you establish a pollution prevention program that will help you be in compliance and reduce waste. Use of the tools from start to finish also helps you qualify for the Green Zia Environmental Excellence Program.

The Green Zia Environmental Excellence Program is a voluntary program based on quality management principles that is designed to help New Mexico businesses achieve environmental excellence through pollution prevention programs.. This program is administered by a partnership of state, local, and federal agencies, academia, private industry, and environmental advocacy groups. This packet has been specifically developed for a dry cleaning operation and is designed to meet the needs of a small business.

The basic logic of the Green Zia Environmental Excellence Program is that:

- waste or pollution is the result of inefficiency;
- reducing waste increases profits;
- waste that is not created cannot pollute.

This guidance has been developed to aid in your company's understanding of best management practices to help your company comply with environmental health and safety regulations and to reduce waste and associated liabilities.

It is important to remember that environmental health and safety regulations are triggered by the use of equipment and chemicals. Better use of chemicals, use of safer chemicals, and efficient operation of machinery can help reduce your regulatory burden--if you aren't using hazardous materials, then you have fewer regulations to be concerned with!

This program is based on first understanding work processes and materials use and then improving work practices to reduce cost, waste, and regulatory concerns.

Working through the Green Zia Environmental Excellence Program will result in a system that helps address environmental issues in cost effective ways, based on sound business practices. The system provides a framework for continuous improvement over time and contributes to a thorough understanding of environmental issues in your business.

What is Pollution Prevention?

Simply put, pollution prevention means not creating a waste in the first place. Pollution prevention is achieved through the efficient use of resources including raw materials, energy, water, and even time and distance. The goal is to produce a product or deliver a service as efficiently as possible with the least amount of wasted materials and the least possible environmental impact.

The bottom line is that pollution prevention or improved efficiency can help businesses save money and help protect the environment at the same time.

What is Environmental Excellence?

Environmental excellence means moving beyond compliance with environmental, health, and safety regulations by establishing an environmental management system that incorporates pollution prevention into core business practices.

A prevention-based environmental management system will:

- help a business identify *all* the environmental compliance, health and safety concerns, and costs associated with a waste generating process; and
- use prevention approaches to reduce or eliminate the waste and reduce the associated costs.

In the Green Zia Environmental Excellence Program, attention is focused on the *process* that generates the waste, not the waste. Identifying and implementing process improvements will reduce waste and costs. This is a major shift from the traditional, reactionary approach that concentrates only on managing wastes or pollutants already created to an anticipatory approach that concentrates on prevention of wastes or pollutants to improve environmental and economic performance. This prevention-first environmental management system will identify cost effective ways to achieve "beyond compliance" status, creating a win-win situation between economics and environment.

The Green Zia Tools:

The Green Zia Program provides tools to establish a basic prevention-based environmental management system. Management and employees walk through the tools as a team to gain a complete understanding of their operation. Examples have been worked out for the dry cleaning business. We encourage you to customize the examples to your own operations. The packet includes a series of process maps for all areas of the dry cleaning operation. Tools 2-6 are also explained and illustrated to help you develop your program. Use of these tools on a regular basis will help your company qualify for the Green Zia Environmental Excellence Program.

Green Zia tools:

Knowledge of Process

Tool 1: Process Mapping: Illustrates the work steps clothing and materials pass through as they are transformed into your final product. Maps allow for the identification of all inputs and outputs such as water, chemicals, electricity, or other materials from a process, helping you to understand wastes and their sources. Maps also help you understand regulated activities.

Full Cost Accounting

Tool 2: Activity-Based Costing: Identifies the true costs of wastes or losses and helps participants identify areas to target for pollution prevention by assigning dollar values to these wastes and losses.

Pinpointing Problems

Tool 3: Root Cause Analysis: Creates a cause and effect diagram to highlight why and where the losses occur in the process. Understanding why and where the loss occurs will help participants focus on specific areas for improvement.

Creative Problem Solving

Tool 4: Brainwriting: Addresses problems by generating as many alternatives as possible to minimize loss.

Prioritization of Options

Tool 5: Bubble-up-bubble-down: Ranks alternatives to determine the optimal solution. Factors such as cost, ease of implementation, and effectiveness are considered in evaluating and ranking the alternatives.

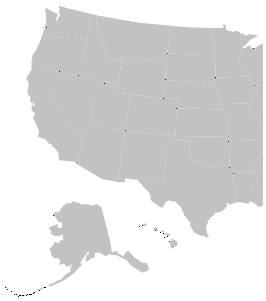
Ensuring Success

Tool 6: Action Plan: Details each step that needs to be taken to implement the alternative and reduce or eliminate the loss from the process.

Tool #1: Process Mapping

To begin incorporating pollution prevention into your business, you must first get a full understanding of where wastes are being generated. This tutorial will discuss the advantages of using process maps to logically evaluate each step of your process.

Warm-up Exercise



Maps have been used throughout the ages for many purposes from helping sailors navigate the seas to providing a safe route for climbers hiking to the tallest peaks. You have probably drawn maps to your home or office so that someone could visit. It is important that the information on this map is complete and accurate or, as you may have found, your guest will get lost!

Take a minute now and think of a coffee shop or restaurant nearby that everyone in the group knows. Draw a map from the building you are currently in to this establishment - include traffic lights, landmarks, and any other important features along the way. Now compare maps with the other members of your group. Are they the same? If a person not familiar with the area were to use your map, would they have found their way?

Introduction

Are you aware of the amount of waste that your business generates? Could this waste be turned into profit? By considering methods of reducing wastes, recycling used and unused raw materials, and reusing lost material, you could not only help the environment but also reduce your raw material and waste disposal costs.

This section discusses process mapping, a method of analyzing a process in order to catalogue all the materials used and lost in the process. With process mapping, you will systematically identify the series of steps materials pass through as they are transformed into the final product. Evaluating your process in this manner will allow you to recognize the opportunities to prevent losses and possibly streamline operations. Each loss identified during the process mapping is an opportunity to prevent that loss.

A series of process maps have been developed for dry cleaning operations and are included in this packet. You should customize these maps for your operation, since no two businesses are exactly alike. These maps become a reference for you to use for your pollution prevention program and can be updated to reflect changes as you improve your operations. These maps are also great for training new employees and for other problem solving needs.

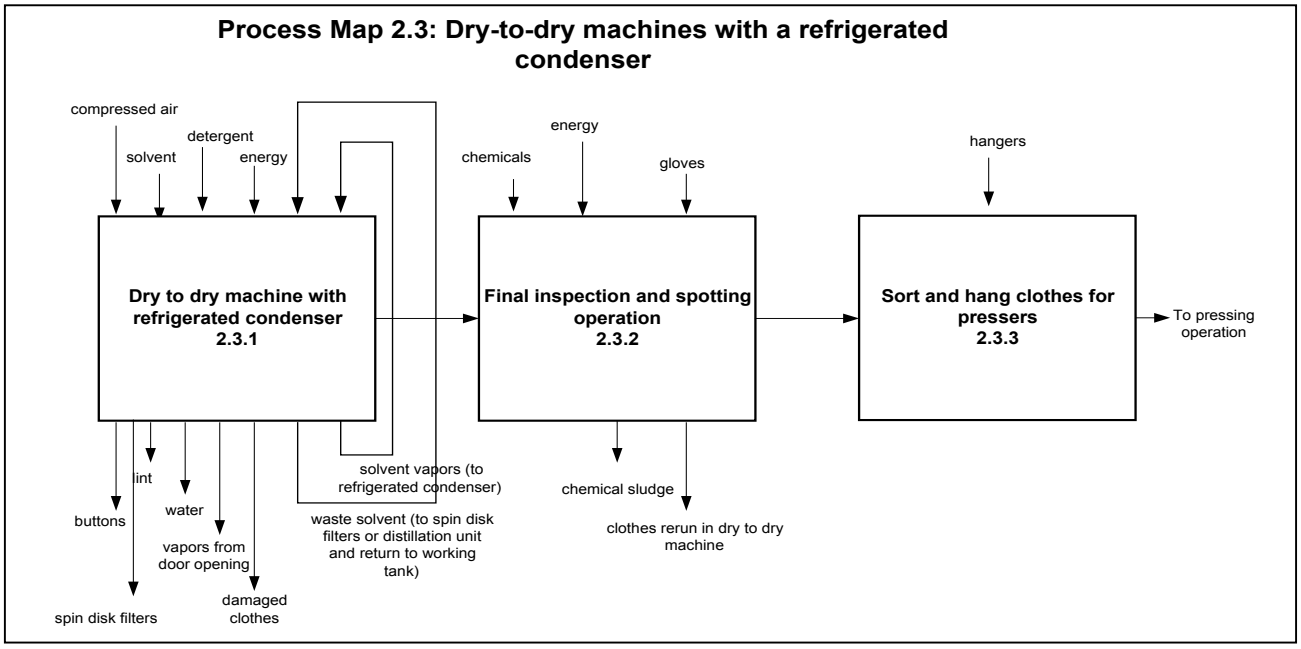
Large businesses and manufacturers use these tools to understand and improve their manufacturing processes. Small businesses can benefit by using these tools as well!

It is helpful to also prepare a narrative to go along with your process maps to explain the process in detail. We recommend that you include regulatory activities in the narratives as part of your environmental management system. Narratives are also included in this packet; please revise to reflect your business operations.

Create a team of employees to complete this exercise. During this exercise you will:

- Examine and revise the process maps and narratives in the packet to accurately reflect your operation
- Fully understand the functionality of each step of a process
- Identify the inputs and outputs/losses within the process
- Communicate findings in a clear and concise manner to members of the team.

Example of a process map for dry cleaning:



Please review the process maps in the back of this booklet and make changes to reflect your operation.

Once you have reviewed and revised the process maps to your operation, move to the next section…Activity-Based Costing!

Tool #2: Activity-Based Costing

Every waste or environmental loss costs you money. By determining which activities cause waste, you can focus your pollution prevention efforts to minimize the cost to your business and to protect the environment. This tutorial will introduce you to a method of evaluating your waste.

Warm-up Exercise

Your daughter approaches you one evening and says that she is planning to buy a car. With the $400 she has left over each month, after paying all of her bills, she is sure she will be able to afford the $220 monthly car payment.

What are the other costs of operating and maintaining a car that she is forgetting? Consider not only the annual costs, such as insurance, but also the intermittent (once in a while) costs. Can she really afford this car?

Introduction

Once you have determined the losses in your processes through your process maps, you can discover how these losses are affecting your "bottom line". How much does it cost you to discard 10% of your raw materials, or 2% of your finished products? Which activities have losses that most hurt the profitability of your company? This tool will help you look at the cost of the losses in your business and see how much these losses are costing you. The results may surprise you!

Which losses should you care about? The Pareto Principle suggests that 80% of the problems in a business come from 20% of machines, raw materials, or operators. (The same is true for any facet of a business; for example, 80% of sales come from 20% of your customers, etc.) Once you have assigned costs to your activities, you can figure out which 20% of your activities are contributing to 80% of your costs. The Pareto Principle is very important in activity-based costing as it is used to focus on the most important areas for improvement in your pollution prevention program. Use of the Pareto Principle for the activity-based costing section will help you quickly identify areas of your business on which to focus your prevention efforts.

New Terms

Activity based costing (ABC) - An accounting method used to assign the cost of your losses to the activities that generate these losses. By assigning costs to activities, you will discover the activities should be targeted for prevention.

Environmental costs -The costs associated with the losses in your process.

Pareto principle - A principle that suggests that 80% of anything can be attributed to 20% of the factors involved. For example, 80% of your environmental costs can be attributed to 20% of your activities.

Intermittent operations - Operations that occur once in a while.

Activity Based Costing

1. Make a list of all the activities in your operation. Be sure to include the activities from your process map as well as any intermittent operations (such as cleaning or maintaining equipment.).

   Regular activities:
   - Spotting
   - Weighing and sorting loads
   - Dry cleaning
   - Placing clothes on hangers
   - Pressing
   - Wrapping

   Intermittent activities:
   - Leak detection, record-keeping
   - Mucking out sludge
   - Replacing cartridge or spin disk filters
   - Fixing leaks
   - Recycling solvent
   - Managing evaporator water
   - Equipment maintenance (boiler, compressor, cleaning equipment)

2. List all of the losses in your operation. Look on your process map and add any others that you think of.

3. Reviewing your process maps, identify the operations in your plant that generate most of your waste or pollution problems. For example, does solvent use cause most of your environmental problems? Does boiler use and maintenance result in your biggest problem? Does the 80/20 Rule apply? Focus your efforts for now on the areas of your operations that you do the most or that create the biggest environmental problem for you.

4. Use process maps to review material use and losses for your selected process or operation. You will use these maps as a guide to assign costs to these losses.

5. Identify which major costs or general ledger costs apply to the material use and losses on the process maps (utilities, chemical purchase costs, waste disposal costs, costs that are easy to get information on and that you typically consider when looking at your processes). Enter into Table 1. (See example provided)

6. Identify which other activities are related to the use of these materials that are not in the major costs (protective equipment such as gloves, monitoring, record keeping,

maintenance, compressors to run equipment, permits, fees to the state or city, storage space for chemicals, the cost of spill clean-up and reporting, etc.). These activities are not usually considered when thinking about the cost of a process, yet the costs associated with them can be significant.

7. Write the activities in the first column of Table 2. Along the top list all the costs or services required for these activities. Add or delete categories as appropriate for your business. Put an "x" for every cell that applies.

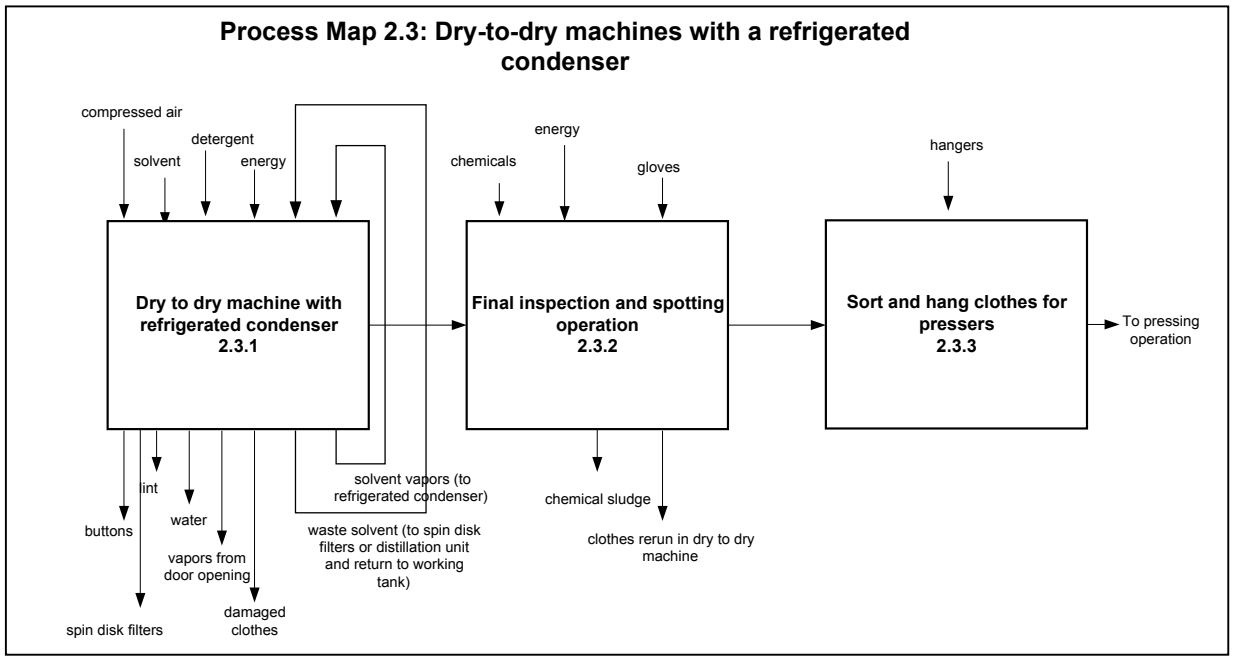
8. Count the total number of "x's" in Table 2. Then circle the x's that represent what you estimate to be about the top 20% of the most expensive activities in your operation. Again, you are using the 80/20 rule: 20 percent of your activities will probably add up to about 80% of your total costs.

9. Then estimate only the cost of each of these top activities that you circled and write them in a new table. Cost estimates are allowable as you are using this method to prioritize your most expensive activities. You can refine costs once you have chosen a project to work on. (In the example, the top 20% of the cost categories chosen have the estimate beside them.) Add these numbers into Table 1 under the appropriate waste stream in the "Hidden costs" line.

10. Add the ledger costs and the hidden costs together to discover the true costs.

11. Create a Pareto Chart. Create a chart showing all these costs graphically. On the x axis (vertical), place costs in dollars, on the y axis (horizontal), show the true costs of the wastes. This chart will help graphically show how all the costs stack up against each other. Does the 80/20 Rule apply here? Use this chart to identify the most expensive processes. This can be used to identify the first area for improvement. Which waste stream do you think you should focus on from this Pareto chart?

Activity-Based Costing Example



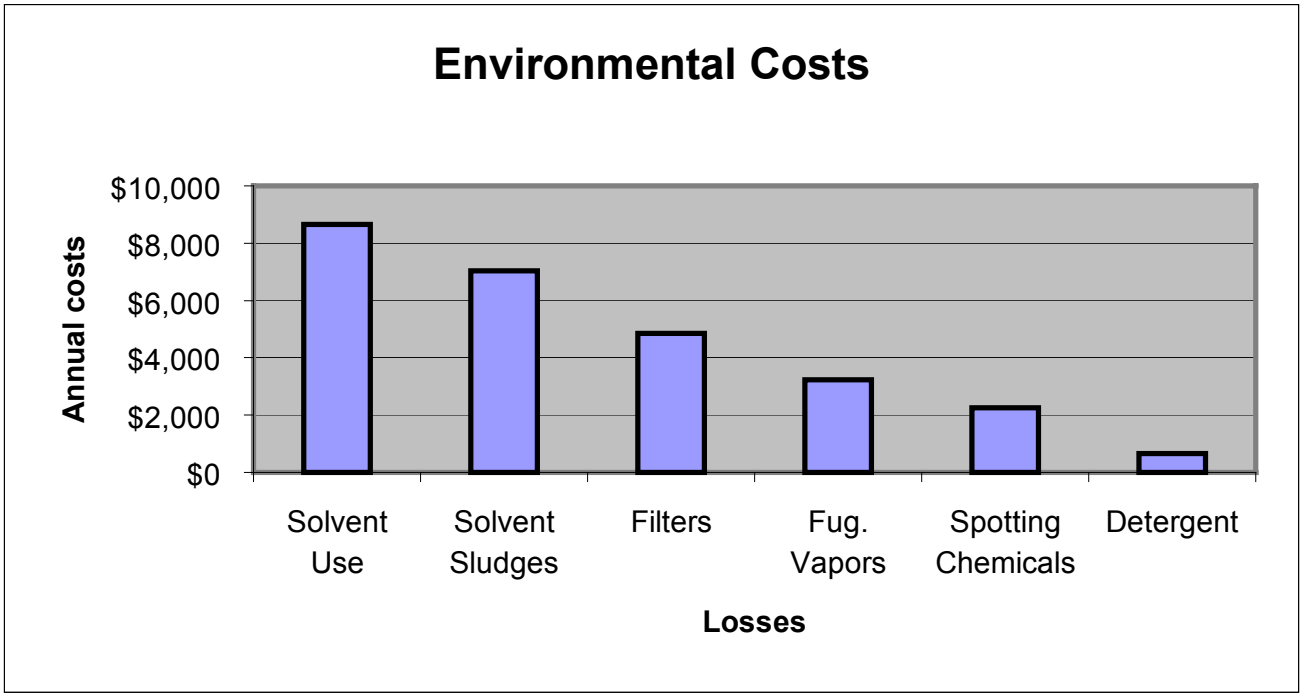
Activities	Materials and Losses
Dry Cleaning Final Spotting Sort and Hang	Buttons/damaged clothes (upset customers/replacement costs) *Detergent *New solvent Lint *Solvent sludge Water from clothes *Fugitive vapors Vapors through condenser and maintenance *Filters Energy Boiler/Compressor *Spotting Chemicals/Chemical sludge Protective Gloves Hangers (*) indicates most important waste streams and materials

Table 1. Activity-Based Costing Analysis (Per year)

Workstep							
Costs/Losses	Fugitive Vapors	Solvent Sludge	Detergent	Solvent Use	Filters	Spotting chemicals	Total
Labor	$2,000				$2,000		$4,000
Raw material			$500	$5,000	$850	$1,500	$7,850
Disposal fees		$2,500				$100	$2,600
Other ledger costs						$150	$150
Hidden Costs	**($1,240)**	**($4,550)**	**($150)**	**($3,650)**	**($2,000)**	**($500)**	**$12,090**
Total	**$3,240**	**$7,050**	**$650**	**$8,650**	**$4,850**	**$2,250**	**$26,690**
%of Total	.121	.264	.024	.324	.18	.084	1.0

Table 2. Hidden Cost Analysis (per year)

Fugitive Vapors					
Activities/Cost Factors	Materials	Space	Utilities	Services	Labor
Monitoring	X ($200)				X ($1040)
Reporting	x				x
Repairs	x			x	x
Total hidden costs for vapors					***($1,240)***
Solvent sludge					
Muck out/disposal	x				X ($2,050)
Spill clean-up	x	x			x
Storage	x	x			x
Record keeping	x			x	X ($1,000)
Generator fees	x				X ($1,500)
Total hidden costs for sludges					***($4,550)***
Detergent					
Storage	x	X ($150)			x
Total hidden costs for detergent					***($150)***
Solvent Use					
Recordkeeping	x				x
Permit fees	x				
Permit				X ($3,000)	X ($650)
Storage	x	x	x		
Spill/clean-up	x			x	x
Total hidden costs for new solvent					***($3,650)***
Filters					
Disposal	x			x	X (1,500)
Repairs	x			x	X ($500)
Total hidden costs for filters					***($2,000)***
Spotting chemicals					
Handling/ disposal	x				X ($500)
Total hidden costs for spotting chemicals					***($500)***



Pareto Chart for Dry Cleaning

The Pareto Chart illustrates costs relative to each other and helps choose areas to target for pollution prevention activities. In this example, solvent use, the most expensive loss, will be the focus of the pollution prevention efforts in the following sections. The example provided is not based on an actual case study, but is provided to illustrate use of the tool.

Now that you have completed the process mapping and activity-based costing, you have a sense of the relative environmental costs of your operations. Since solvent use is the target, we will use the following problem-solving and decision-making tools to find a way to reduce solvent use, increase efficiency and save money.

Most of your work is done. These two tools can be revised as needed. Use these maps and information annually (or more often) to keep improving your operation on an ongoing basis. Now that you have identified your most expensive wastes, you can now move towards solving problems and eliminating waste: the next tool is Root Cause Analysis!

Table 1. Activity-Based Costing Analysis (Per year)

Workstep							
Costs/Losses							Total
Labor							
Raw material							
Disposal fees							
Other ledger costs							
Hidden Costs							
Total							
%of Total							

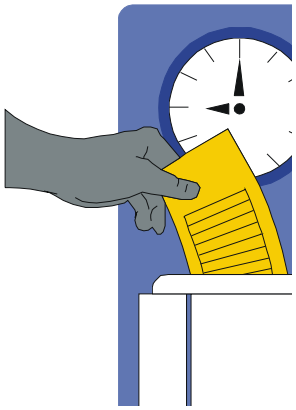
Table 2. Hidden Cost Analysis (per year)

Activities/Cost Factors	Materials	Space	Utilities	Services	Labor
Waste Stream					
Monitoring					
Reporting					
Repairs					
Muck out/disposal					
Spill clean-up					
Storage					
Record keeping					
Generator fees					
Total hidden costs for (waste stream)					
Waste Stream					
Monitoring					
Reporting					
Repairs					
Muck out/disposal					
Spill clean-up					
Storage					
Record keeping					
Generator fees					
Total hidden costs for (waste stream)					
Waste Stream					
Monitoring					
Reporting					
Repairs					
Muck out/disposal					
Spill clean-up					
Storage					
Record keeping					
Generator fees					
Total hidden costs for (waste stream)					

Tool #3: Root Cause Analysis

Now that you have recognized the activities in your process that are expensive to your business, you can begin to focus your efforts on pollution prevention. This tool presents a method of detecting the underlying reason for an environmental loss so that the loss can be prevented.

Warm-up Exercise



Think of all of the times that you have been late for work and list the different reasons for your delay. Maybe your alarm clock did not go off, or perhaps your child was sick and you needed to arrange for a sitter. Did you spend too much time reading the newspaper or did you need to run to the store to pick up milk?

Arrange all these reasons in the categories listed below, or create an additional category. Some of the items on your list may be entered more than once.

Now consider the last time you were late for work. Why were you late? Circle the reason.

MACHINES
broken alarm clock

PEOPLE
sick child

METHODS
reading the newspaper

MATERIALS
out of milk

Introduction

In the last tool you determined the key losses responsible for the greatest amount of environmental costs. In order to try to prevent a loss, you must first understand why it is occurring. The underlying reason for a loss is also known as its "root cause". The root cause will answer the question: What *ultimately* caused the loss? Determining the root cause of an environmental loss is very similar to determining the root cause of being late for work

A cause and effect diagram is one method of determining the root cause for a loss. This tool provides a visual description of all possible causes for a specific loss. Once all the possible causes are depicted on the diagram, the most plausible cause or causes are identified. It is imperative that all persons involved in determining the root cause are in agreement. The next step is to write a "Dear Abby" letter summarizing the cause or causes for a loss will ensure that all participants see the problem in the same way.

During this exercise you will:

- Construct a cause and effect diagram with all potential causes for a loss
- Discuss the most probable cause or causes
- Write a Dear Abby letter describing the reason for the loss.

Root Cause Analysis

After participating in process mapping and activity based costing exercises, it was determined that the largest loss, solvent use, accounts for approximately 80% of all environmental costs in the dry cleaning operation. The next step is to discover the root cause of this loss.

To determine the root cause of a loss, you must ask: “Why is the loss occurring?” One way of gathering information concerning the generation of a loss is called a cause and effect diagram, or fish bone diagram, since it resembles a fish bone. Major categories of possible causes for the loss are first defined and entered on the diagram as an offshoot from a main horizontal line. Next, all possible causes of the waste are assigned to a category and entered on the diagram. Once all the causes are defined, an agreement is made as to the most plausible reason for the loss.

Divide the causes into four major categories-- Methods, Machines, Materials, and People-- and then write down all the possible reasons why solvents could be lost from the process and assign them to a category. Begin the diagram and then write down some of the things that immediately come to mind. An example has been provided in Figure 2.

Several things may come to mind. Clothes must be sorted by color and type. Poor sorting may lead to color bleeding, damaged clothing, and loss of solvent due to color bleeding. Improperly weighed loads may result in inefficient solvent use. Workplace conditions such as a dirty, disorganized work area may lead to solvent spills and contamination. The machines are expensive and require proper operation and maintenance. Filters must be changed regularly, the distillation and recycling unit must be operating properly, and the machine must be set for the proper loads. The solvent quality and detergent additives must be monitored. Also, training and a good work attitude are critical to efficient operations. All of these ideas should be entered under one of the four categories in the fishbone diagram: Machines, Methods, Materials and People as in the example in Figure 2.

Now that all the possible causes of solvent being lost during the dry cleaning process are categorized, it is time to determine the most probable cause. Go back to the diagram and circle the most probable causes. One of these should be the root cause**.** Then, working with employees as a team, discuss which one of these major causes is the root cause. To come to clear understanding of the root cause, we suggest that the team write a short "Dear Abby" letter describing the interpretation of the problem to ensure that each person sees the problem the same way. Once the letter is in place, the group becomes Abby and seeks to solve the problem. *(see Figure 3)*

Another method for determining the root cause of a problem is the "5 whys."

By asking the question "why?" five times, you may get to the root cause of a problem. An example of how the five whys works is as follows.

The Five Whys:

1. Why has the machine stopped, forcing an interruption in production?
A circuit breaker tripped due to an overload.
2. Why was there an overload?
There was not enough lubrication for the bearings.
3. Why was there too little lubrication for the bearings?
The pump was not pumping enough lubrication.
4. Why was there not enough lubricant being pumped?
The pump shaft was vibrating because of abrasion.
5. Why was there abrasion?
There was no filter, which allowed chips of metal to get into the pump.

The solution is then to place a filter on the pump to capture metal chips.

Both tools can be used to find the root cause of the problem. For most problems to be permanently solved the root cause must be addressed. The fishbone diagram is a good visual tool that helps you understand all the areas that contribute to a problem. Understanding all the contributing factors will help facilitate problem solving. The Five Whys will also help you move past dealing with the symptoms of the problem to solving the real problem.

Examples of the fishbone diagram and a Dear Abby letter as well as a blank fishbone diagram are included for your use.

The next tutorial will present brainwriting - a method to generate ideas.

Figure 1: Dry Cleaning Process - Process Map

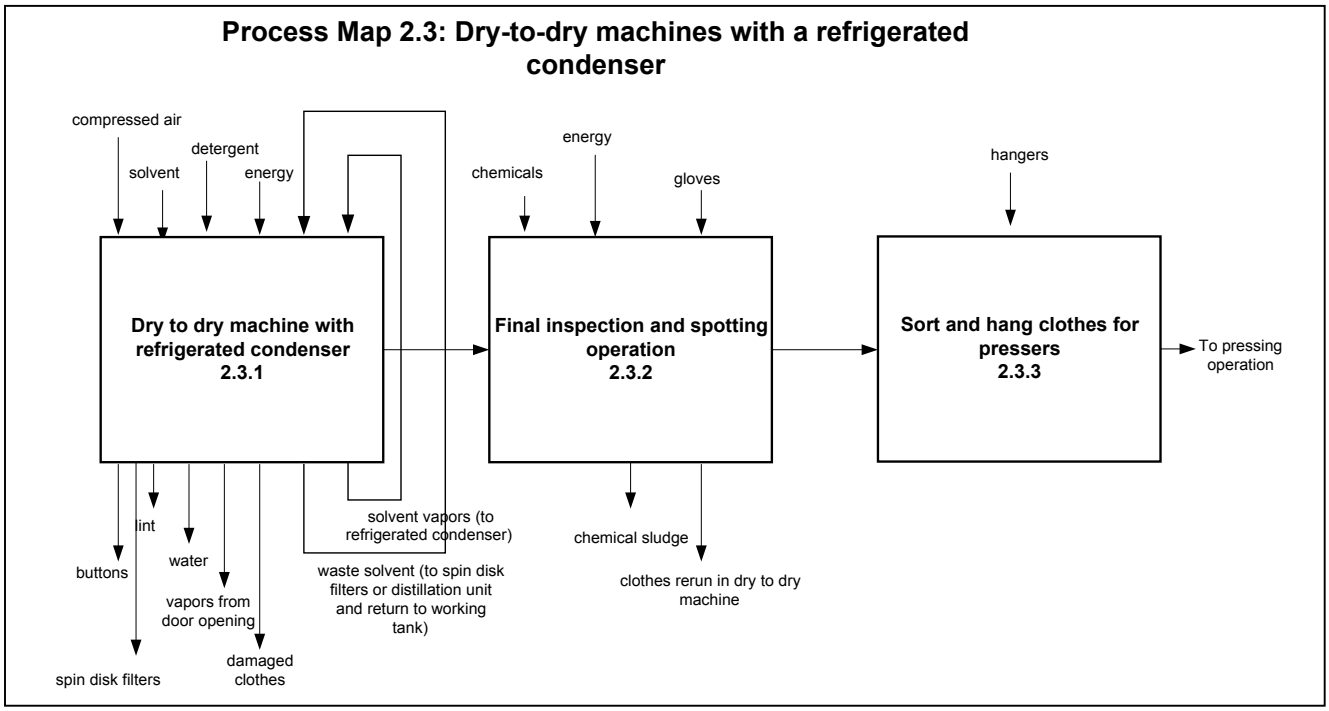


Figure 2: Cause and Effect Diagram

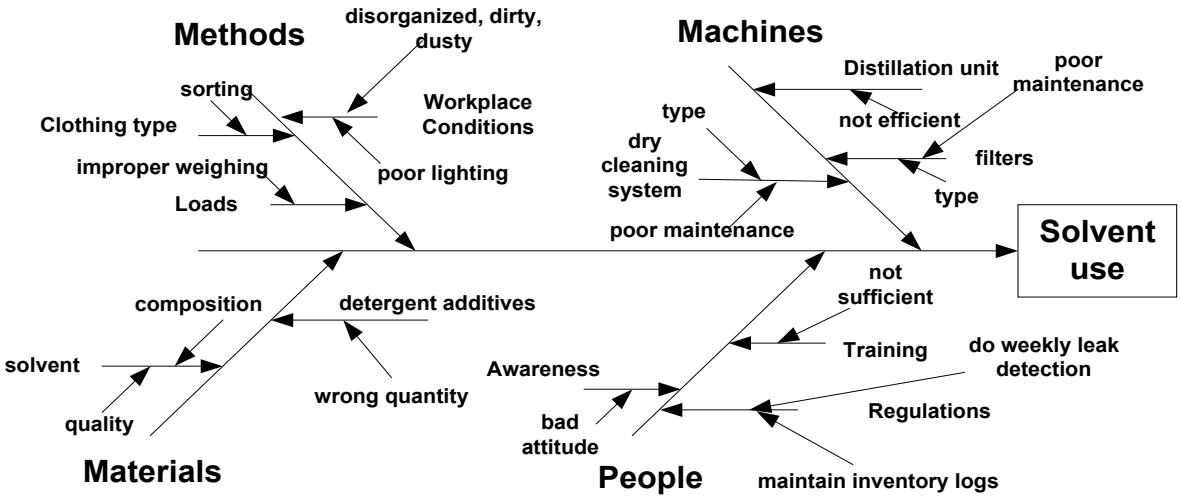


Figure 3: Dear Abby Letter

Dear Abby,

We run a small dry cleaning operation. Use of solvent is our most expensive business issue. Solvents are highly regulated and we must comply with lots of regulations from air quality and hazardous waste to health and safety. Some dry cleaning plants have had to pay lots of money for clean-up of contaminated sites which has put them out of business. These are issues that we wish to take seriously.

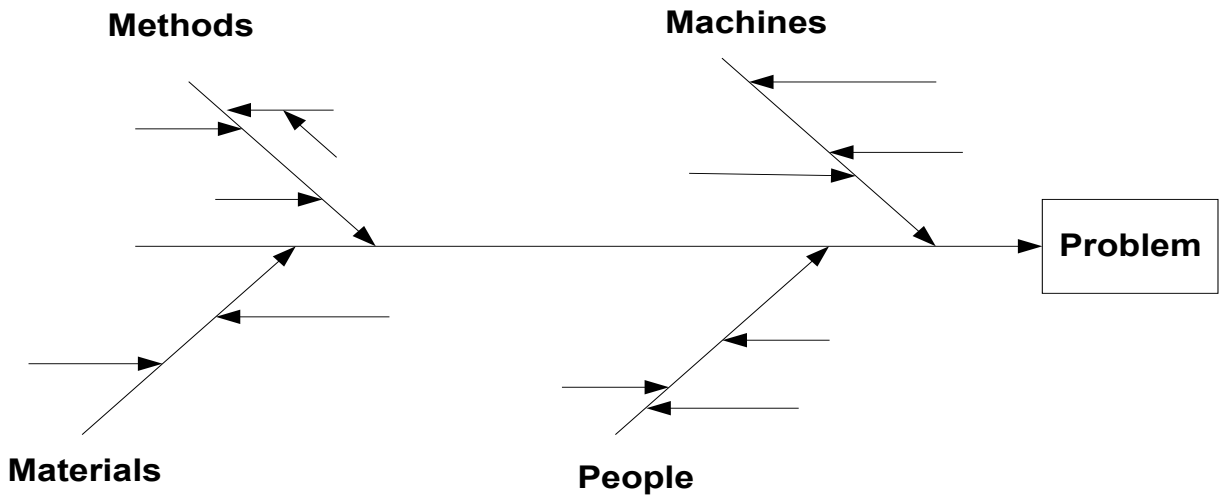
Our group did root cause analysis and we believe that our biggest problem is employee awareness. Employees affect solvent use from loading the machines and maintaining the equipment to keeping the operation clean and making sure we are in compliance with regulations. However, as you know, our employees have a billion things to do every day and they often don't stick around for enough time to get proper training.

Can you help us?

Signed,

Cleaning up in Farmington

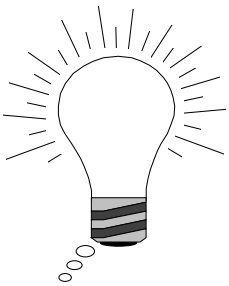
Root cause analysis: Fishbone Diagram



Tool #4: Brainwriting

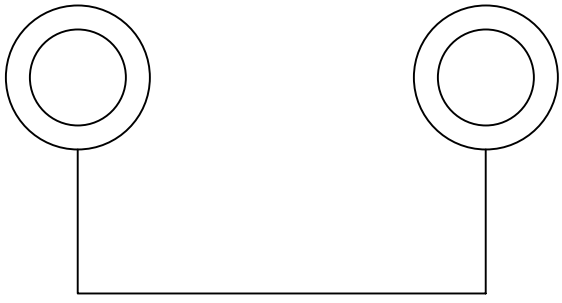
To address an opportunity effectively, it is important to recognize all alternatives. Very rarely is there one "right" way of preventing pollution. Instead, there are many different potential solutions. This tutorial presents a technique of listing many different alternatives for an opportunity.

Warm-up Exercise



You know the old adage “two heads are better than one.” This is especially true when trying to come up with new ideas. When you generate ideas in a group you will notice that each member of the group brings their unique set of experiences and strengths to the table.

Try the following exercise with your group. Look at the picture below (turn it on it's side and upside-down). What does it remind you of? Write down all the images that come to mind--even images that seem crazy should be included. Now go around the room, each person sharing one image with the group. One person should volunteer to keep a list of all the images. Repeat this step until every member of the group is out of images. How many images did the group come up with? How does this compare with the number of images you generated alone?



Introduction

In the last tool you evaluated all the probable causes of a loss and determined the underlying reason, or root cause. Once the root cause has been identified, you may be tempted to jump to a premature solution. When you address a loss without considering all the alternatives of prevention you may be overlooking the most appropriate option(s).

Looking for alternatives for pollution prevention by addressing its root cause is the next step towards addressing an opportunity. There are several tools available to help groups develop alternatives. You already explored one tool during the warm-up exercise. In this exercise you will explore another method--brainwriting. Brainwriting requires maximum interaction and creativity between group members. All possible alternatives, regardless of how far-fetched they appear, are considered by the group. Alternatives raised by the group may seem contradictory, or they may build on one another to make them better. A comprehensive list of alternatives can then be compiled.

During this exercise you will:

- Conduct a brainwriting session
- Develop a list of all possible alternatives for an opportunity for improvement

Brainwriting

You have completed your process map to see how you can optimize your processes and reduce losses. *(see Figure 1)* In the example provided, Activity-Based Costing helped to identify that 80% of the environmental costs associated with dry cleaning were due to solvent use. Not only are solvents expensive, they are considered a hazardous waste and a hazardous air pollutant and they must be handled very carefully. Spills must be avoided to eliminate employee exposures and site contamination.

Root cause analysis determined that the greatest losses occurred due to employee handling practices. Employees control the dry cleaning processes from the beginning to the end and also must deal with environmental, health, and safety compliance issues.

The next step is to develop as many alternatives to solve the problem as possible. This is done through the process of brainwriting. Through brainwriting, staff works together to generate as many alternatives as possible regardless of how crazy they seem. In fact, to make it more interesting you can give a prize to the person that comes up with the craziest idea.

Make copies of the blank brainwriting sheet included at the end of this chapter. Make enough sheets so that each person on the brainwriting team has one per person with one

blank sheet in the middle of the table. Place these sheets in the center of the table. Each person should take a sheet and write two alternatives on it and then place the sheet back in the center. Then take another sheet of paper and write two more alternatives on it. Every time someone picks up a sheet of paper, encourage them to read what others have written and try to make improvements to the alternatives listed. Someone could even say they think someone's idea is completely out in left field, if they try to make it better. Keep repeating this process until everyone runs out of ideas.

Now list all the alternatives that were discovered.

The alternatives on each sheet of paper should be read aloud and discussed. Many of the ideas may be the same and some may have small variations. The group should debate the small variations and eliminated the impossible alternatives. One comprehensive list should be developed—with each idea only written once, although all variations of the same idea should be included.

Examples of brainwriting are provided below.

The next tutorial will present bubble-up, bubble-down--a method for selecting the best option to prevent loss.

Figure 1: Dry Cleaning Process Map

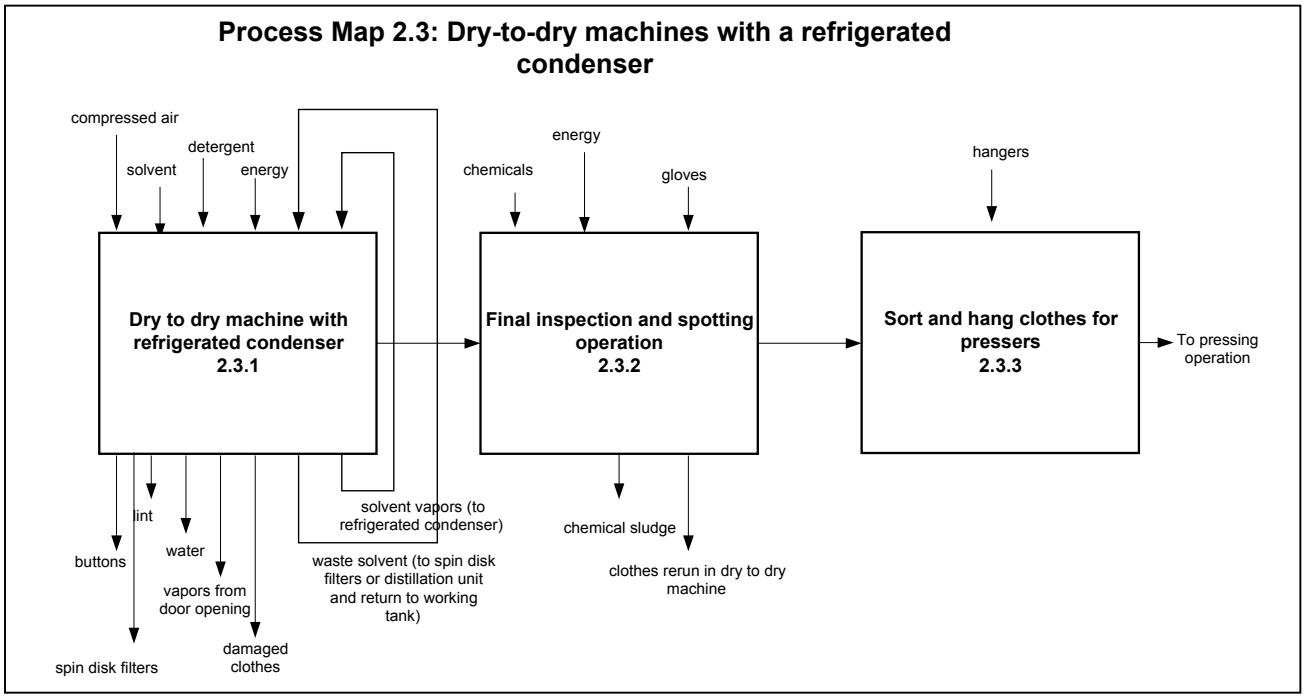


Figure 2: Sample of brainwriting

1. Use non-toxic solvent to eliminate all environmental problems.	2. Train people to maintain filtration system and distillation systems better.
3. Employees could run really dirty clothes through the dirtiest solvent, and then clean again in regular solvent.	4. Investigate wet cleaning systems.
5. Start a "clean shop" program to train employees to keep work areas clean to prevent spills and waste.	6. Begin an employee incentive program to reward best operating practices for operating dry cleaning machine and reducing clothing damage problems.
7. Start a energy conservation program and focus on boiler and presses.	8. Spot fairly clean clothes, run through an air tumbler, then press…some things may not need full cleaning
9. Pay employees small bonus for keeping good environmental records including hazardous waste and air quality records.	10. Test solvent to see if we are replacing too soon.

Figure 3: List of alternatives

1. Use non-toxic solvent to eliminate all environmental problems.
2. Train people to maintain filtration and distillation systems better.
3. Employees could run really dirty clothes through the dirtiest solvent, and then clean again in regular solvent.
4. Investigate wet cleaning systems.
5. Start a "clean shop" program to train employees to keep work areas clean to prevent spills and waste.
6. Begin an employee incentive program to reward best operating practices for operating dry cleaning machine and reducing clothing damage problems.
7. Start an energy conservation program and focus on boiler and presses.
8. Spot fairly clean clothes, run through an air tumbler, then press…some things may not need full cleaning.
9. Pay employees small bonus for keeping good environmental records including hazardous waste and air quality records.
10. Test solvent to see if we are replacing too soon.
11. Create an employee problem-solving team to deal with waste of all kinds on a regular basis.
12. Train workers on pollution prevention and ways to reduce and reclaim spills.
13. Provide incentives for employees who reduce losses.
14. Start a customer information program to inform them of our environmental program.
15. Invest in better equipment.

Figure 4: Brainwriting Sheet

1.	2.
3.	4.
5.	6.
7.	8.
9.	10.

Tool #5: Bubble-Up, Bubble-Down

You have now generated a list of alternatives for preventing an environmental loss in your business. But how do you choose the best alternative? This tutorial presents one method of prioritizing alternatives to ensure that the most appropriate alternative is selected.

Warm-up Exercise

Most of us use lists from time to time to make sure that we don't forget to do the things that we need to get done. Without a shopping list, for example, we may return from the store without milk, the reason why we went in the first place. Certain limitations, like time or money, may cause us to drop things off our list. We often need to prioritize and make sure that the most important things get done.

Make a list of the things that you need to get done tomorrow (try to list at least ten things). List these items in the order that they come to mind. Now prioritize this list by putting the most important items on the top of the list and the least important items on the bottom. You should now have a "rank ordered" list. If you only have time to complete one of the items on your list, which would it be? The item on the top of the list should have been your most important item.

Introduction

A comprehensive list of pollution prevention alternatives was developed in the last tool using a technique called brainwriting. The alternatives generated during this tutorial can range from operational changes, such as employee training and improvements in operations, to technology changes, such as changing a solvent. The next step is to choose one alternative that is capable of being worked with successfully. Additionally, it is important to select the optimal solution for your business. To accomplish this, you must consider the *feasibility* of each alternative. Such factors as effectiveness, implementability, cost, and potential ramifications of each alternative should be discussed. Personal preferences and biased information should not enter into the decision-making process.

There are several tools available to aid a group in selecting an alternative while avoiding bias. These tools allow a group to rank and prioritize alternatives using a systematic approach. When all the alternatives are listed, suggestions are made by the group to improve even the worst alternatives. At this point, many of the alternatives may be eliminated; every realistic alternative remains on the list. These remaining alternatives can then be sorted based on the factors presented above and any other factors that may affect a particular business. The method of selection presented in the exercise is the bubble-up, bubble-down. This tool uses a forced pair comparison to rank alternatives. Using this method you will be able to find the most effective solution to the selected loss.

During this exercise you will:

- Evaluate all alternatives.
- Use the bubble-up, bubble-down method to reach a decision on the best alternative.

Bubble-Up, Bubble-Down

Take the list of alternatives and compare the first two alternatives. Decide which of the two is the best and move this alternative to the top of the list. Go to the next, or third alternative and compare it to the second. If it is better than the second, move it up and compare it to the first, if not, leave it in the third position. Continue this process until all the alternatives are rank ordered. This process should go fairly quickly. Make sure you listen to everyone's opinions and objections. Again, factors to consider are cost, effectiveness, and the ability to implement the alternative.

Bubble-up, Bubble-down should generate much discussion among employees on the best solutions. These discussions will help to increase buy-in to the alternatives. As a rule, employees never resist their own ideas.

An example of how the Bubble-Up Bubble-Down method was applied to the list of alternatives generated in the last tool is listed below.

Typically, the three or four alternatives that "bubbled-up" to the top of the list are the easiest and cheapest to implement, the "low-hanging fruit". The alternatives in the middle may require more research or study to see if they are feasible. The ideas at the bottom of the list may require major equipment changes or capital investments. It is important to keep the entire list on file as part of your continuous environmental improvement program.

The next step is to develop an action plan. Action planning is essential to assure that ideas are implemented!

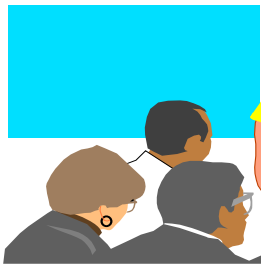
Figure 1: List of alternatives, prioritized using Bubble Up, Bubble Down

1. Begin an employee incentive program to reward best operating practices for operating dry cleaning machine and reducing clothing damage problems. Provide incentives for employees who reduce losses.
2. Create an employee problem-solving team to deal with waste of all kinds on a regular basis.
3. Train people to maintain filtration and distillation systems better.
4. Train workers on pollution prevention and ways to reduce and reclaim spills.
5. Pay employees small bonus for keeping good environmental records including hazardous waste and air quality records.
6. Start a "clean shop" program to train employees to keep work areas clean to prevent spills and waste.
7. Start a customer information program to inform them of our environmental program.
8. Test solvent to see if we are replacing too soon.
9. Start an energy conservation program and focus on boiler and presses.
10. Spot fairly clean clothes, run through an air tumbler, then press…some things may not need full cleaning.
11. Use non-toxic solvent to eliminate all environmental problems.
12. Investigate wet cleaning systems.
13. Invest in better equipment.
14. Employees could run really dirty clothes through the dirtiest solvent, and then clean again in regular solvent.

Tool #6: Action Planning

Being able to successfully manage a project is important when trying to accomplish a task, especially when you are under a deadline. You need to set up a schedule, ensure that you have the necessary resources, and assign the right person to each part of the job. In this tutorial you will create an "action plan" for the implementation of an alternative to prevent pollution.

Warm-up Exercise



Your group has been assigned the task of making chocolate chip cookies. The cookies need to be ready in one hour and the cooking time is twelve minutes. Pick a person to manage this project. The manager must then assign the ten tasks listed below to individuals in the group.

You will need to know how much time is required for each task, what tasks need to be accomplished before others, what resources (i.e. bowls, flour etc.) are required, and what the most efficient way of organizing these tasks (and remember the clock is ticking). Create a schedule.

Making chocolate-chip cookies:

Mix dry ingredients
Mix wet ingredients
Put the batter on the pan and put pan into the oven
Combining wet and dry ingredients
Turn on the oven
Taste cookies
Wash tools and utensils
Grease pan
Take cookies out of the oven

Developing an Action Plan

Before you begin to implement your alternative you should complete this questionnaire. It will ensure that you are being thorough in your planning and thay you have considered all the important issues that may arise, such as the resources that are needed and the problems that may occur. *(see Figure 2)*

Things to consider in developing an action plan are resources needed, both financial and human resources; the need for pilot testing or bench scale testing; and information sources from the outside such as trade associations, vendors, suppliers, and the Environment Department. Other issues such as employee support and maintaining product or service quality should be considered. A list of questions that should be considered during action planning is as follows:

Action Planning Questionnaire

1. What is the overall objective and ideal situation?
2. What steps are needed to get there from here?
3. What actions need to be done?
4. Who will be responsible for each action?
5. What is the best sequence of action?
6. How long will each step take and when should it be done?
7. How can we be sure that earlier steps will be done in time for later steps that depend on them?
8. What training is required to ensure that all staff has sufficient know-how to execute each step in the plan?
9. What standards do you want to set?
10. What volume or quality is desirable?
11. What resources are needed and how will you get them?
12. How will you measure results?
13. How will you follow up each step and who will do it?
14. What checkpoints and milestones should be established?
15. What are the make/break vital steps and how can you ensure they succeed?
16. What could go wrong and how will you get around it?
17. Who will this plan affect and how will it affect them?
18. How can the plan be adjusted without jeopardizing its results for the best response and impact?
19. How will you communicate the plant to generate support?

Now put all of this information in an Action Plan Form. Most of the information that you need should come from your answers to the questionnaire. The specific task, or step, to be accomplished is written in the first column under "Action." In the following column list the person who is responsible for completing this task. A performance standard should then be

provided. This standard is a way of establishing how well a task needs to be performed. Under "monitoring technique" enter a measurable goal or target used to track the plan's implementation. A firm deadline should then be set, and finally, indicate the resources that are needed to perform each task. This form will help you organize your thoughts, keep track of all the actions that need to be completed, and ensure that the proper quality is being maintained.

Use the form provided to track implementation of the project and to measure its success. A sample action planning form is included at the end of this section.

Action Plan Form for Employee Incentive Program

Overall Target: Employee Incentive Program					
Action	Responsible person	Performance standard	Monitoring technique	Completion deadline	Resources needed
1.Develop Program incentives	Carol	List of incentives	Discuss ideas with Marge the owner	Jan 15	Team of Carol and Mark
2.Design a program for review and giving incentives	Marcy	Approved program by Marge	Marge approves, allocates funding.	Feb 1	Action #1 complete
3. Meet with employees	Carol, Mark and Marge	Highly interactive meeting	Question employees before and after	Feb 15	Firm date for meeting; meeting room
4. Set up improvement/suggestion box, system	Carol	System in place, all employees are aware, easy to use	Number of ideas submitted	March 1	Box, access to company computer, review team
5. Review Team	Carol and Mark	Review team reviews suggestions monthly	Marge evaluates work	March 7	Ideas accepted/implemented
6. Incentives awarded	Marge	Ideas implemented, paying off in $$, improvements	Check on progress, success	June1	Cash bonuses, days off, etc

Congratulations!!! You have completed the Pollution Prevention Training. Now it is time to put these tools to work and remember that pollution prevention is an ongoing process. If you continue to implement pollution prevention in your business, you will increase the efficiency of your process while helping the environment. Simply revisiting your process maps and Pareto Chart once a year and using the tools to continue to make improvements will make a big difference in your operation. Ongoing use of these tools will help you to participate in the Green Zia Environmental Excellence Program.

Here are a few suggestions to make pollution prevention continue to work for you:

- ***Return to the Nothing to Waste activities and concepts as you make business decisions.***

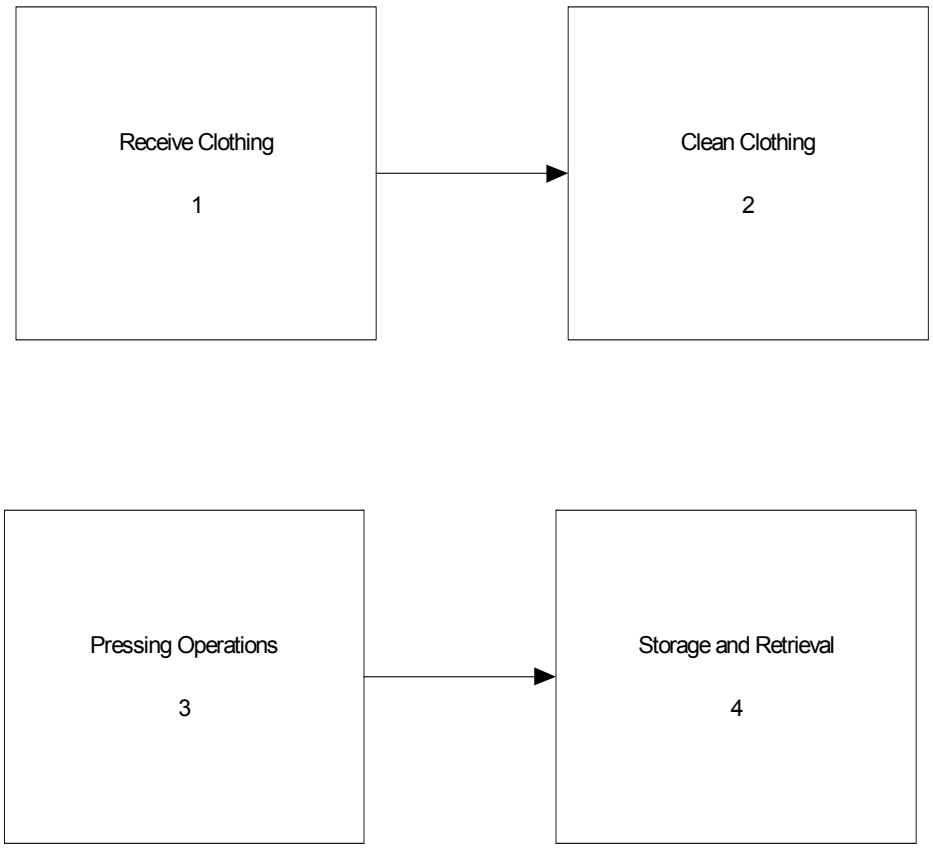
- ***Schedule regular pollution prevention reviews of your business.***

Remember: Pollution Prevention saves resources, saves money, and prevents accidents!

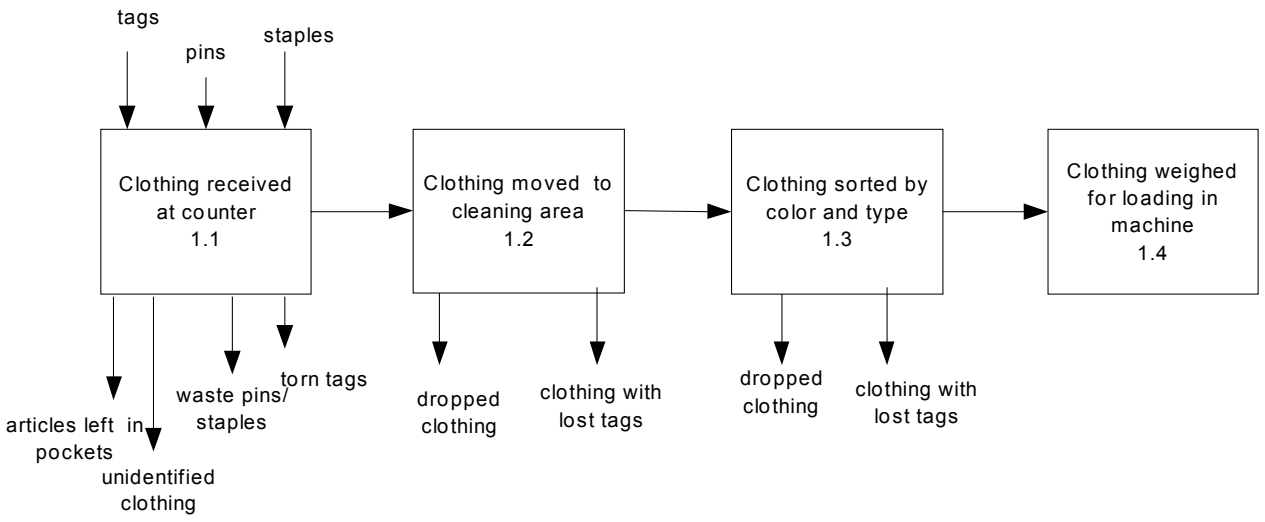
Overall Target					
Action	Responsible person	Performance Standard	Monitoring Technique	Completion Deadline	Resources Needed
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Process Maps for Dry Cleaners

Dry Cleaning Overview Process Map



Process Map 1.0: Receiving/Processing Clothing



Process Map 1.0: Clothing Receipt and Preparation

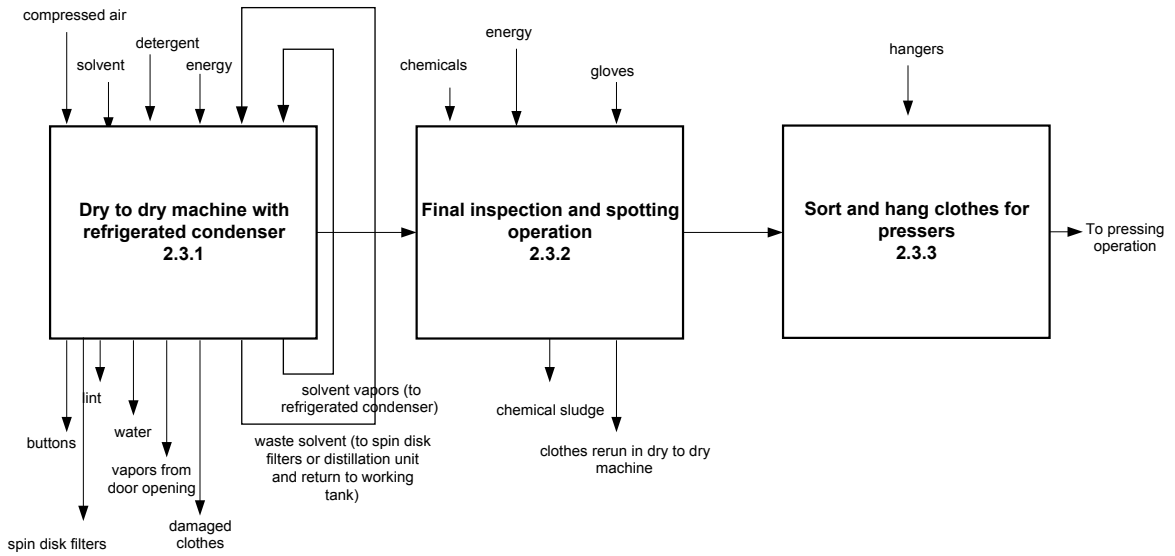
1.1 Clothing Received at Counter
As clothes are received at the counter, employee staple or pin identification tags to the individual pieces of clothing. Customers may also leave articles in pockets that must be thrown away or retained for the customer once the clothes are cleaned. This step generates wastes such as torn tags, pins and staples and various other wastes from the customer's clothing. Also, clothing not properly identified may wind up as lost or unclaimed clothing.

1.2 Clothing Moved to Cleaning Area
Clothes are moved to the cleaning area and are inspected for stains.

1.3 Clothing Sorted by Color and Type
Once the clothing is in the cleaning area, employees sort it by color and type. The employee also decides which washing method should be used for each garment. Delicate garments are sometimes segregated and hand washed.

1.4 Clothing Weighed for Loading in Machine
Employees weigh the clothing before loading it into the machine. Machine is set based on weight of load. Properly weighted loads may increase solvent cleaning efficiency.

Process Map 2.3: Dry-to-dry machines with a refrigerated condenser



Process Map 2.0: Process Map for Dry to Dry Cleaning Machine with Built-in Refrigerated Condenser

2.3.1 Dry to Dry Machine with Built-in Refrigerated Condensers

In this process, the washer and dryer are integrated into one unit. The clothes are washed with a mixture of solvent (Perchloroethylene) and detergent. This process also uses energy. The cleaning process generates a waste which is comprised of a mixture of solvent, water, and detergent. Water is the byproduct of air humidity and residual sweat trapped in the garment. Used solvent is recycled through a closed loop distillation unit where it is reclaimed and recycled back into the cleaning process. During cleaning, some solvent vapors are lost to the atmosphere as employees open the machine door. Also, lint uild up around the machine door loosens the seal and results in some solvent vapor leaks. Clothing may also be damaged during this process due to shrinkage or color transfer. Other wastes include lost buttons and lint. Button losses require matching of replacement buttons, sewing and perhaps special purchases of new buttons. Lint is managed as a hazardous waste. Water is separated and is sent though an evaporator. Environmental compliance issues relative to this process, if it is Perchloroethylene-based, include leak detection, recordkeeping, notification requirements, solvent purchase recordkeeping requirements to meet air quality standards, and OSHA exposure requirements; hazardous waste compliance issues may apply to spent filters, lint, evaporator water, and sludges for recyciling or distaillation unit. As a general rule, any material that comes into contact with Perchloroethylene may be a regulated hazardous waste. A general rule also is that any water or material that has come into contact with Perchloroethylene should never be poured down a drain.

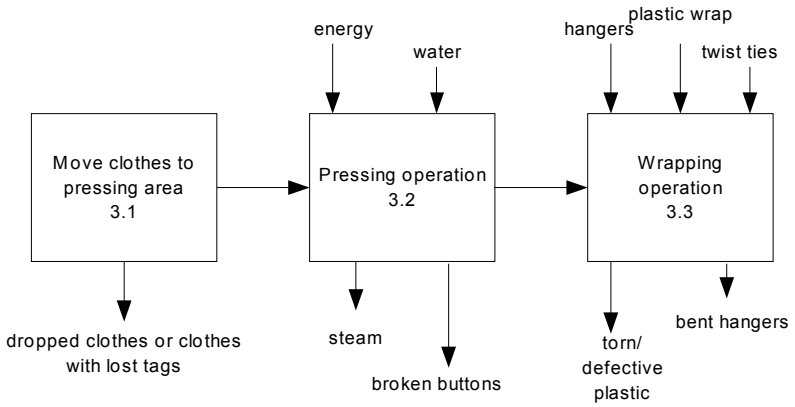
2.3.2 Inspection/Final Spotting Operation

Once the clothes are dry, they are taken out of the dryer and inspected. Clothes that are not sufficiently cleaned are spotted and cleaned again. The spotting operation includes removing stains and dirty areas by using chemicals, steam, and scrubbing. In this process, employees use several kinds of spotting chemicals because different stains require different chemicals. For example, certain cleaning products are used for water soluble stains such as grass stains while other cleaning chemicals are required for non-water soluble stains such as ink. Garments are placed on the spotting table that is equipped with a vacuum device. Employees place the spotting chemicals on the stain while the vacuum sucks the chemicals into a canister. During this procedure, employees use chemicals, soaps, detergents, commercial spotting agents, energy, and protective gloves. This process generates small amounts of chemical sludge waste.

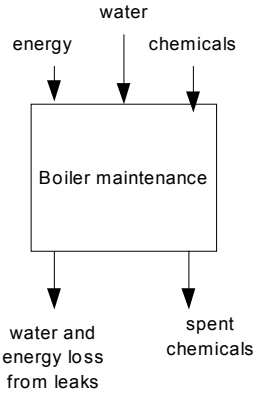
2.3.3 Sort and Hang Clothes for Pressers

Clothing is placed on hangers and sent to the pressing area. Some solvent vapors may be released to the atmosphere from offgassing from the clothing.

Process Map 3.0: Dry Cleaning Pressing Operation



Ancillary Operation: Boilers



Process Map 3.0 : Pressing Operation

3.1 Move Clothes to Pressing Area
Employees prepare and move the clothes to the pressing area. Losses associated with this process include dropped clothing and clothing with lost tags.

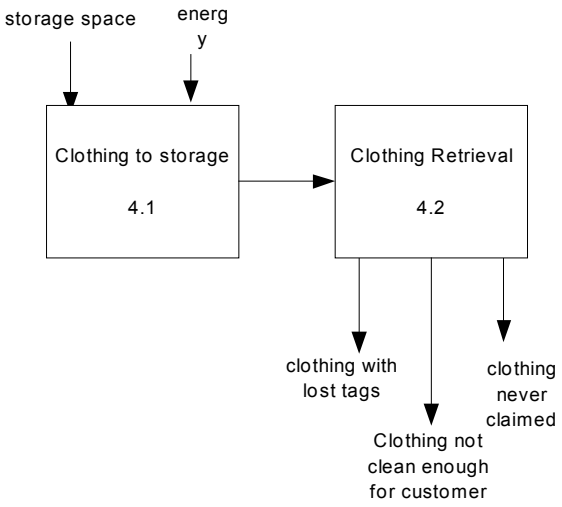
3.2 Pressing Operation
Clothing is pressed either on tables or on pressing forms. Wastes or losses include energy and water from steam and broken buttons or damaged clothing from pressing. Energy losses may occur around leaks in compressor or steam lines.

3.3 Wrapping Operation
Employees prepare the clothing for the customers by hanging the clothes on hangers, batching the clothes by customer order, wrapping them in plastic wrap, and twisting the tops of the plastic wraps with twist ties. Wastes includes torn plastic, bent hangers, dropped clothing or clothing accidentally placed into the wrong order.

Support Process for Pressing Operation : Boiler Maintenance

Boiler maintenance includes maintenance and chemicals. Boilers also use a significant amount of energy.

Process Map 4.0: Clothing Storage and Retrieval

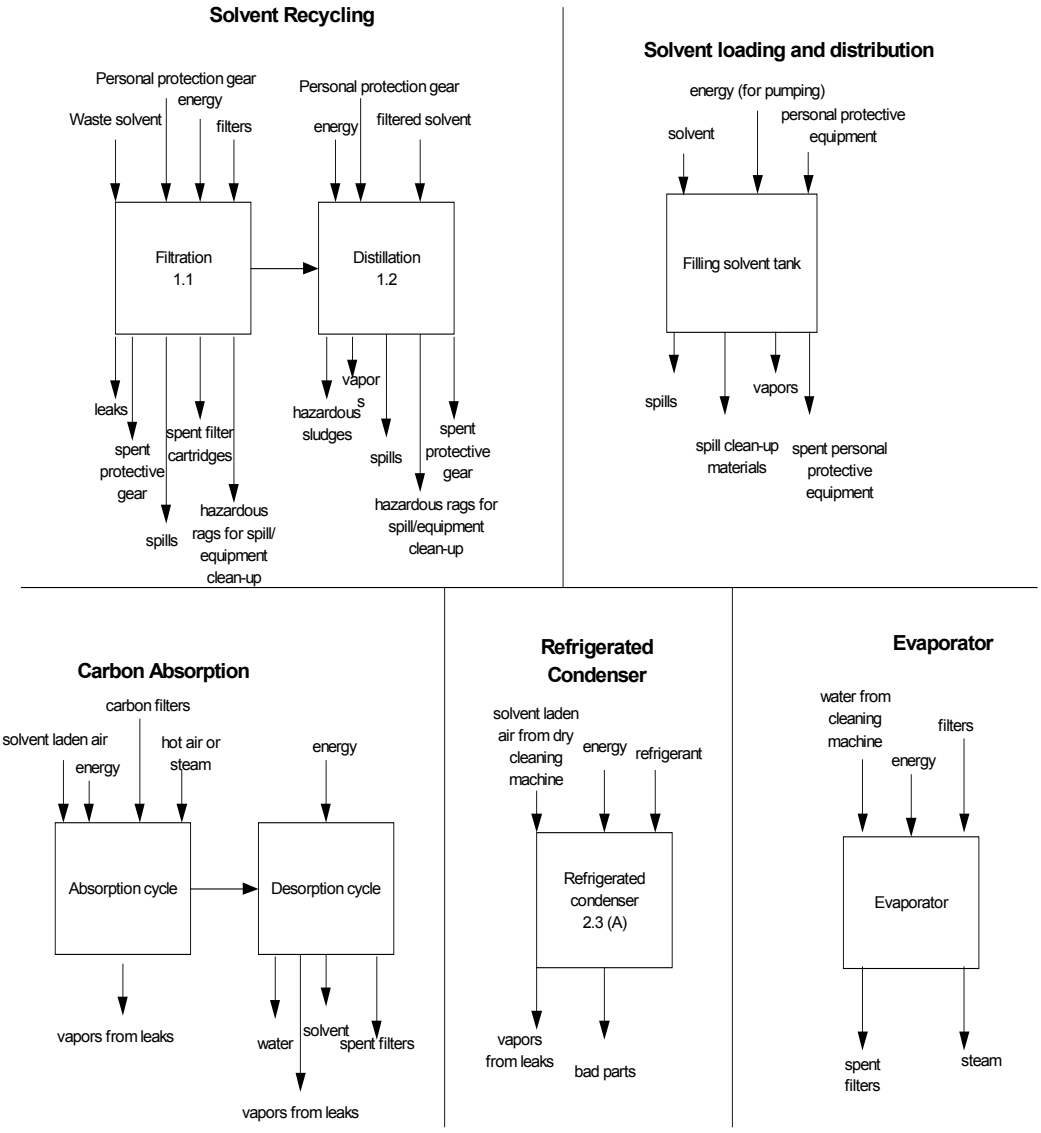


Process Map 4.0 : Clothing Storage and Retrieval

4.1 Clothing Storage
During this process, clothes are moved to the storage area. Losses may include energy and floor space which is required to maintain the storage area. Additional losses include clothing that is never retrieved, clothing that is not picked up promptly by the customer, or clothing that has lost its identification tags.

4.2 Clothing Retrieval
Clothing is retrieved at the counter. Losses may include customer dissatisfaction with cleaning quality. The customer may also find the clothing not clean enough and request that the dry cleaner repeat the process.

Intermittent Process Summary Map



No narratives are provided for these process maps.

Dry Cleaning Regulatory Guidance, Pollution Prevention Ideas and Other Resources

Dry Cleaning Industry: Pollution Prevention Fact Sheet

Eliminate - reduce - reuse - recycle - exchange

The Dry Cleaning Industry is faced with a challenge of overcoming pollution in the workplace. Most of the environmental concern centers around the atmospheric escape of the primary solvent used in the clothes washing cycle. Since 1995 when the manufacture of chlorofluorocarbons (CFC-113) and trichloroethane (TCA) were banned, the solvent of choice has become **perchloroethylene** (PCE or Perc), with approximately **93% of U.S. dry cleaners using it**.

Perc is a toxic chemical that is a suspected **carcinogen** and can harm the central nervous system, lungs, liver, and kidneys. Environmentally, Perc is **non-biodegradable** and can react with sunlight to form carbon tetrachloride, a powerful **ozone-depleting** chemical.

Petroleum-based solvents are an alternative to Perc. However, due to their **high flammability**, they combust more easily in heated applications and are subsequently prohibited in most states. New petroleum-based solvents, mainly azeotropic blends of glycol ethers, are entering the solvent market. Though some of these new solvents are biodegradable and less toxic to human health, many contain **volatile organic compounds** (VOC's).

Equipment

As information concerning the risks involved in using various dry cleaning solvents has been made available over the past five decades, various alterations have been made to the standard machine, resulting in six generations of machines currently in use:

- First generation machines, called transfer machines, consisted of a separate washer and dryer that allowed evaporated solvent to leak into the air during transfer.

- Second generation machines, or "dry to dry" machines, allowed both cycles to occur in the same machine, eliminating the transfer step and thus preventing the leakage of solvent.

- Third generation machines, or closed-loop machines, incorporated either a refrigerated condenser or a carbon absorber, both of which are designed to filter used solvent from the air stream.

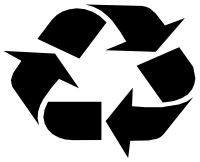
- Fourth generation machines included a secondary internal vapor recovery device to further decontaminate the machine's waste stream.

- Fifth generation machines add an automatic still clean out, eliminating the need for human contact with toxic still sludge.

- Sixth generation machines contain a monitoring computer to control Perc concentrations in the machine and work area.

Although each new generation improved the quality of the machines, each also brought new environmental concerns to the table. For example, first generation machines leaked so much solvent into the air that the National Emission Standards for Hazardous Air Pollutants (NESHAP) has **banned the manufacture** of new transfer machines.

Second generation machines require more maintenance and are less flexible, which **increase costs** to the operator. They are also still **potentially dangerous** because they exhaust their air into the environment.



However, greater automation and better technology often leads to **higher maintenance costs** and **more frequent malfunctions**. While the final three generations each improved waste disposal, they also became more expensive and harder to maintain.

Many lower generation machines can be **retrofitted** with additional containment, filtering, or condensing equipment to increase solvent efficiency and containment to that of higher generation levels.

Process

The following are practical solutions to help dry cleaning establishments reduce human health risk and environmental contamination. These suggestions have been successfully implemented by establishments throughout the industry.

- Use closed containers for collection and storage of recovered or new solvent.
- Clean drying sensors and filters weekly.
- Replace all valve seals and door gaskets regularly.
- Check and repair hoses and exhaust ducts.
- Experiment with optimizing solvent distillation, condensation, or filtering equipment.
- Experiment with exhaust parameters, such as exhaust or air exchange velocity.
- Replace machine with dry to dry, close-loop machine with internal refrigerated condensing and carbon absorbing capabilities.
- Upgrade machines with added refrigerated condenser, secondary carbon absorber for solvent vapor containment, and a spill container.
- Replace dry cleaning process with wet cleaning process (see below).
- Replace Perc or petroleum-based solvent machine with a liquid carbon dioxide machine.

- Make sure washer and dryer are in close proximity and properly enclosed.
- Install distillation equipment with closed containment still bottoms for safer removal and disposal of still sludge.

- Replace cartridge filters with spin disk filters which can be cleaned without opening.

- Use a carbon absorber that is regenerated with hot air stripping rather than steam stripping, minimizing water waste.

- Incorporate a door fan local exhaust system to capture solvent vapors during opening of machine door.

- Use double carbon waste water treatment devices to clean up Perc-soiled waste streams, recycling treated waste water to the process boiler.

New Technologies on the Market

Two new systems are now available for the dry cleaning industry. The first system includes a detergent that enhances the dissolution ability of liquid carbon dioxide and the second system **replaces dry cleaning with wet cleaning**, a technology which supplements a standard water solvent with fiber protective additives.

The **major drawback** of each of these technologies is the cost of undertaking new equipment. Also, even with special dryers that check the temperature through humidity level selection, wet cleaning systems are not able to clean 100% of fabrics and may cause shrinkage. Wet cleaning operations include three major processes, which creates a labor-intensive operation.

Pollution Prevention and YOU

The **Green Zia Program of New Mexico** encourages all businesses to get involved with a program to eliminate waste. It is better to eliminate waste then to recycle, treat, or reduce waste. It is up to even the small businesses to work together and make our environment safer. When implementing a pollution prevention program, remember these principles:

- Build **quality** into the workplace. Commit to keeping your workplace safe for workers and the environment.

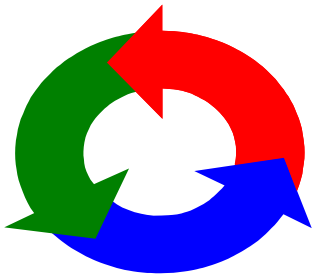
- **Eliminate errors**. Take control of the workplace.

- Implement your idea now. If a solution has better than a 50-50 chance of succeeding, **start right away**. Compliance with environmental issues can be costly, especially for small businesses, and a pollution prevention plan can save money.

- Strive for **continuous environmental improvemen**t. Any operation that generates waste can move beyond compliance and incorporate pollution prevention into core business practices.

- Work as a **team**. Involve employees in brainstorming sessions to get different views of the problem.

- Find the **root of the problem** to find a great solution.



Dry Cleaning Regulatory Guidance Materials

EVERYTHING YOU WANTED TO KNOW ABOUT DRY CLEANER REGULATIONS BUT WERE AFRAID TO ASK

Dry Cleaners in New Mexico

The dry cleaning industry, due to its use of perchloroethylene, is controlled by state and federal regulations dealing primarily with air emissions, hazardous waste management, wastewater, and employee health and safety. Table II-1 on pages II-2 and II-3 in the "Plain English Guide For Perc Dry Cleaners" (EPA 305-B-96-002) gives a good overall review of regulatory requirements and recommendations. The following information will be given to provide corrections, additions, or clarifications to the EPA document.

Perchloroethylene (also referred to as PCE, PERC, tetrachloroethene, and tetrachloroethylene) is the main product used by dry cleaners. You may come across different regulatory documents that use PERC or PCE when referring to perchloroethylene. For clarity, we will only use the term PERC in this document. Even though it is not stated in the EPA document, the controls discussed are based on the maximum achievable control technology (MACT) for major dry cleaners and generally available control technologies (GACT) for non-major dry cleaners as specified in section 112 of the Clean Air Act.

Air Emissions:

Dry cleaners are classified as small area, large area, or major based on the yearly amount of PERC purchased on a rolling average. Table II-2 located on page II-7 has a chart you can use to determine your classification. Page II-8 has examples of how you calculate a rolling average. Figure II-5 on page II-35 contains a sample log sheet for PERC purchases. It is important to monitor your purchases, especially if you are close to being reclassified as a larger facility. Generally speaking, the larger the facility the greater the regulatory requirements. If a facility purchases more than 1,470 gallons of PERC in a one-year period of time, they will be required to apply for a Title V operating permit. At present, if a facility is required to obtain a Title V permit they will be required to maintain the record-keeping at that level even if their usage goes down. However, if, for example, you are classified by EPA as a large area dry cleaner and your rolling average for a 12-month period went below 140 gallons per year for 2 consecutive years, you can request to be reclassified by the EPA.

The regulatory requirements established by EPA are called the National Emission Standards for Hazardous Air Pollutants (NESHAP). A common requirement for all facilities in compliance with NESHAP regardless of classification is that they must meet good housekeeping, monitoring, record keeping, reporting, and leak detection/repair requirements. See attached table labeled "EPA Air Requirements for Dry Cleaners" for an overall view. The requirements for the PCE NESHAP are

divided in 4 categories: emissions control equipment, emissions equipment monitoring, fugitive emissions control, and record keeping and reporting.

Emission Control Equipment:

Emission controls that are required are based on the type of machines and the date that they were installed. Table II-2 contains information on which controls are required for your facility. Keep in mind that there are no regulatory requirements on the manufacturer of dry cleaning equipment. The responsibility of regulatory compliance is yours. You should only purchase equipment capable of complying with the regulations.

Emission Control Monitoring:

Those facilities using carbon absorbers as the main PERC vapor recovery system must be aware that if the unit cannot be repaired it must be replaced with a refrigerated condenser. The carbon absorber requires a sampling port in the exhaust stack to measure its efficiency. Page II-21 explains how a sampling port can be installed. Information on testing can be found on pages II-33, 34, & 35. Since carbon absorbers vent their exhaust into the air, it is advisable that they be replaced with a refrigerated condenser to recover more PERC and reduce air emissions.

Refrigerated condensers require monitoring of temperature differences. Page II-32 has information on how this is accomplished. You need to be aware that the refrigerant in your condenser may need to be replaced in the future as refrigerants, such as R-22, are phased out. Such units will generally need to be retrofitted or replaced. Check with the manufacturer of your equipment.

Fugitive Emissions Control:

To reduce the amount of PERC emissions to the air, all PERC dry cleaners must conduct a leak detection and repair program on a regular basis. Pages II-30 and II-32 list the requirements. Figure II-2 on page II-31 is a sample of a "Monthly Machine Maintenance and Perchloroethylene Log" that can assist you.

Record Keeping and Reporting:

NESHAP requires you to fill out three reports at the start of your operation and send them to the EPA Region VI contact listed at the end of this document. The reports are an “Initial Notification Report”, a “Pollution Prevention Compliance Report”, and if an emission control device is installed, a “Control Requirements Compliance Report”. Copies of the forms are located in Appendix B. A copy of these three reports should be kept at the facility.

All dry cleaners are required to keep a logbook in order to demonstrate compliance with EPA air regulations. The information should be complete for the past 5 years of operation and should contain the following:

- Receipts of PERC purchases
- Monthly totals of PERC purchases
- Calculations performed on the first of each month to determine a rolling average
- Dates on which dry cleaning machines were inspected for leaks
- Locations of any detected leaks and a record of repair activities
- Results of temperature monitoring of refrigerated condensers
- Results of carbon absorber outlet concentrations

In addition to maintaining the facility log, copies of the design specification and operating manuals must be kept on site for each dry cleaning system and emission control device at the facility. Figure II-2 on page II-31 contains a sample log for maintenance record keeping. Figure II-5 on page II-35 contains a sample log for PERC purchases.

Hazardous Waste

Just like under Air Regulations, a facility is classified as either a Conditionally Exempt Small Quantity Generator (CESQG), a Small Quantity Generator (SQG), or a Large Quantity Generator (LCG) based on the amount of hazardous waste they generate on a monthly basis. Table II-4 on page II-11 has a chart that can be used to determine into which category your facility falls. There are different regulatory requirements for each category. Table II-5 on page II-12 is a summary of the regulatory requirements for each category. Unlike the categories under the Air Regulations, a facility can move from one category to another on a monthly basis.

Any waste that is contaminated with PERC, such as the button trap, lint screen, still bottom residue, spent filter cartridges, filter muck, process water, carbon filters, and/or cooked powder residue is considered a hazardous waste as well as any unused PERC that is to be disposed.

Instructions on how to properly count the quantity of hazardous waste you generate can be found on page II-9. This is important since it will affect which category you are in for a particular month. This will also affect the quantity and time frames that you are allowed to store your hazardous waste, whether or not you need to manifest your waste, as well as requirements for reporting, level of personnel training and container maintenance. Figure II-6 on page II-41 contains a copy of a Uniform Hazardous Waste Manifest.

Page II-13 states that all SQGs and LQGs are required to send their hazardous waste to an RCRA-permitted facility. Unless subject to stricter state requirements, CESQGs

may send their hazardous waste to a state approved solid waste facility (municipal landfill) or to a RCRA permitted facility. At present, the New Mexico Solid Waste Regulations allow hazardous waste from a CESQG to be disposed at a municipal landfill as long the waste can pass the paint filter test (no free liquids).

It is important to be aware that the facility generating the hazardous waste is ultimately responsible for ensuring the hauler and the facility excepting the waste are RCRA permitted. If a CESQG is able to dispose of their waste at a municipal landfill then the hauler must be registered by the New Mexico Solid Waste Bureau.

It is also important to remember that all hazardous waste must be kept in a leak-proof, tightly covered container. The only exception is the small hole allowed in a separator water collection bucket. See the paragraphs below dealing with waste water. On page II-37 it states, "keep tanks covered or provide at least 2 feet of freeboard (space at the top of the tank) in uncovered tanks." This statement is not true in New Mexico. Any tank that contains PERC or PERC contaminated waste MUST be a closed container.

All facilities should have a contingency/emergency plan in place at their facility. Only LQGs are required to have a written plan approved by the New Mexico Hazardous Waste Bureau. Pages II-27, 28, &29 contain information to help establish a proper plan. It is very important that the facility have a person assigned to be the emergency coordinator. This person will be responsible for ensuring that emergency procedures are carried out in the event of an emergency. The New Mexico Environment Department has a 24-hour emergency reporting number that you can call in case there is an incident dealing with hazardous materials. The number is 505-827-9329.

Staff should be properly trained in the use of the equipment and dealing with emergencies. Hazardous Operator Training (hazwoper), however, is not required for dry cleaners.

All SQGs and LQGs are required to obtain an EPA Identification Number. Figure II-1 on page II-24 shows a copy of the form to use. CESQGs are not required to have EPA ID numbers; however, you need to keep in mind that it is possible for a facility to change status on a monthly basis. Therefore, if you are presently a CESQG and if you ever generate more than 220 pounds of hazardous waste in any particular month, your status would change to a SQG for that month. Since it costs nothing to get an EPA ID number, you should apply for one.

Wastewater:

Any water, regardless of how it became contaminated, that contains more than 0.7 ppm (parts per million) of PERC is considered hazardous waste and must be dealt with according to RCRA regulations. Placing PERC-contaminated wastewater

directly onto or into the ground (e.g. septic systems, underground injection well, etc.) is prohibited.

One is also discouraged from disposing of PERC-contaminated waste water into the sewer system. Even though a waste water treatment plant may accept PERC-contaminated waste water, it does not relieve a facility of being responsible for contaminating ground water with PERC if there is a leak in the sewer pipes. It is also in the best interest of the facility to make sure that any cracks in their floors are sealed in case any PERC gets on the floor due to leaks or spillage. Should the ground water be contaminated by any means and the source of PERC is traced back to your facility, you could be responsible for its clean up and may also receive a significant fine. The cost of clean up would be far greater than the costs associated with proper handling of your waste water.

Separator water, which typically contains 150 ppm of PERC, is by definition a hazardous material. There are two options available to deal with this waste water:

Option 1: Store and dispose of the separator water as you would any other hazardous waste. If you are collecting your separator water by letting your separator tank overflow drip into a bucket, the bucket must be kept covered to minimize evaporation. A small hole in the cover to allow entry of the hose from the separator water tank is acceptable. The bucket must not be allowed to overflow.

Option 2: You may evaporate your separator water if it has first been treated to reduce its PERC concentration to below 0.7 ppm. EPA has allowed a dry cleaner to treat its separator water on site without the need of a RCRA permit using either a mister or evaporator. Misters are usually used by smaller facilities whereas an evaporator is used by larger facilities. Treatment can be accomplished by passing the separator water through two granular activated carbon units in series prior to evaporation. The activated carbon units must be operated and maintained so that the separator water never exceeds 0.7 ppm PERC concentration.

Treated water can now be allowed to evaporate in the air or be used as boiler water for example. However, you should not dispose of this treated water in the sewer. Should there be a problem with the sewer pipes leaking, continuous disposal down the sewer could conceivably increase the concentration in ground water above the 0.7ppm level.

Underground Storage Tanks

The only time a dry cleaner needs to be concerned with underground storage tank (UST) regulations is if they store their PERC in an UST. However, if the UST containing the PERC is connected directly to their machine, it is considered part of the operation and is not regulated by the Environment Department. This does not relieve you of responsibility should the tank leak and contaminate ground water.

OSHA

The Occupational Health and Safety Bureau has a consultation program in place to assist facilities to be in compliance with OSHA regulations. A copy of "Frequently Asked Questions" about the program is included with this document. Also attached is a copy of a "Check List for Dry Cleaning Exposure to Perchloroethylene (PERC)"as well as a poster that you are encouraged to display at your facility.

CONTACTS:

EPA

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Underground Storage Tank Bureau

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Online Resources:

International Fabricare: www.fabriclink.com
US EPA: Design for the Environment: www.epa.gov/opprintr/dfe

Additional Sources of Information:

Document No.	Name of Document:
EPA 744-K-98-002	Design for the Environment: Frequently Asked Questions about Drycleaning
EPA 305-B-96-001	Multimedia Inspection Guidance for Dry Cleaning Facilities

EPA Air Requirements for Dry Cleaners

Equipment Requirements			
Requirements	**Small Area Source**	**Large Area Source**	**Major Source**
Surround all Existing Transfer Machines with a room enclosure vented by a Carbon Absorber	Not required	Not required	Required by 9/23/96
Installation of main Perc Vapor Recovery System*	Required for New machines at start-up	Required for New machines at start-up and Existing machines by 9/23/96	Required for New machines at start-up and Existing machines by 9/23/96
Installation of additional Carbon Absorber for Residual Perc Recovery System	Not required	Not required	Required for New machines at start-up and Existing machines by 9/23/96

Emissions Equipment Monitoring	
Requirement	**All Sources**
Monitoring of Refrigerated Condensers	Weekly monitoring required
Monitoring of Carbon Absorbers	Weekly monitoring required

Fugitive Emissions Control			
Requirement	**Small Area Source**	**Large Area Source**	**Major Source**
Leak detection program	Biweekly inspection	Weekly inspection	Weekly inspection
Simple leak repairs	Repair within 24 hours.		
Leak repairs requiring parts ordering	Order parts within 2 days. Install parts within 5 days of receipt.		
Disposal of cartridge filters	Drain for at least 24 hours.		
General operation of dry cleaning machines	As per manufacture's specifications and recommendations.		
Keep machine doors closed except when transferring garments	Required		
Store perc and perc waste in tightly sealed containers	Required		

Reporting	
Requirements	**All Sources**
Initial Compliance Report	Required upon start-up.
Additional Compliance Reports	Required 30 days after any change in facility status including a change in ownership, address, equipment, or size category.

Record Keeping-Must be kept for 5 years.			
Requirement	**Small Area Source**	**Large Area Source**	**Major Source**
Perc Purchase Log	Record purchases from receipts for entire facility and calculate on the first of every month. Keep all receipts. Maintain a 12 month running total.**		
Leak Inspection Log	Biweekly inspection and record**	Weekly inspection and record**	Weekly inspection and record**
Maintenance Log	Record all repairs needed, parts ordered and installed. Also record tests of exhaust from the carbon absorber and temperature of the refrigerated condenser, if required for your facility.**		

* Perc Vapor Recovery Systems must be either Existing Carbon Absorbers installed before September 22,1993 or Refrigerated Condensers.

**An example is provided in Appendix B.

OSHA Check list for Dry Cleaning Exposure to Perchloroethylene (PERC)

PERC is the most commonly used dry cleaning solvent. It can enter the body by breathing it and through the skin. Symptoms associated with exposure including damage to the liver and kidneys, memory loss, confusion, dizziness, headache, drowsiness, and eye and throat irritation. Repeated skin exposures may cause dermatitis. PERC is also thought to cause cancer in humans.

General measures for controlling PERC

To reduce the exposure to PERC, a comprehensive control approach should be followed. This includes the use of engineering measures, work practices, and personal protection equipment. Engineering controls are the most preferred and effective means of controlling exposure. Substitution with another less toxic solvent is an effective means of eliminating exposure to PERC.

Can PERC be replaced with another solvent?			
Are the dry cleaning machines isolated from other work areas?			
Do employees unload the machines after the clothing is dried?			
Are vapor recovery systems leak free?			
Are the machines free from liquid PERC leaks?			
Are the machines free from gaseous PERC leaks?			
Are the employees wearing personal protective equipment?			
Are the machines ventilated to capture PERC when the doors are open?			
Does the shop have fresh air supply to dilute the amount of PERC in the air?			
Do the doors lock so they can't be opened while the machine is operating?			
Are full drying times maintained?			

Control of PERC using Machine Design

Machine design can reduce or eliminate employee exposure to PERC as well as reduce the amount of PERC released into the atmosphere. Machines that are self-contained with vapor capturing systems do not allow PERC to be released into the work place. Examine your machines to determine the following. The optimum type machine is a dry-to-dry machine with a refrigerated condenser and carbon adsorber.

Do you use a dry-to-dry machine?			
Is this machine vented?			
Is this machine non-vented with a secondary vapor control?			
Does the machine have a drum monitor to indicate levels o PERC?			
Does the machine have a refrigerated condenser?			
Does the machine have a carbon adsorber?			
Does the machine have a door lock mechanism that prevents the loading or unloading of the machine before the end of the cycle?			
Is the machine automatically filled with PERC so that employees don't have contact?			
Is the PERC system completely enclosed?			

Controlling PERC hazards by material substitution

By substituting another solvent for PERC, the exposure is not only reduced, it is eliminated. Currently, two potential alternatives to PERC are on the market. They are Wet-cleaning and Petroleum-Based dry-cleaning. Modern wet cleaning is a method to clean by water immersion of garments usually cleaned in solvents. Petroleum-based dry-cleaning has been used in garment cleaning for many years. These alternatives have different physical properties from PERC that affect there cleaning performance as well as their health and safety hazards.

Can PERC be substituted with another product?			
Is the substitution less toxic than PERC?			
Is PERC less flammable than the substitution product?			

Controlling PERC hazards by ventilation

An effective means of controlling PERC exposure is through ventilation controls. These controls can be part of the machine design, a local exhaust system, or general ventilation. It is important to remember that ventilation controls do not eliminate the PERC vapors but instead, capture or dilute the vapors before they reach the workers breathing zone.

Does the machine have built-in ventilation controls?			
Can the machine be retrofitted with ventilation controls?			
Can a capture type hood be placed over the dryer door?			
If the machine has a capture type hood, does it have a velocity of 100 feet per minute?			
Does the exhaust from the machine exit at least five feet above the roof to prevent reentry into the building?			
Can cross drafts that interfere with the local exhaust ventilation be eliminated?			
When using general ventilation for dilution, does the air change every five minutes?			
Do supply and exhaust systems move the air from a clean area to a less clean area?			
Does the shop have an adequate supply of fresh air?			

Other hazards in your dry-cleaning shop

Within the dry-cleaning shop, employees are exposed to numerous hazards. As the employer, you should identify and eliminate these hazards. One method of doing this is by conducting a hazard assessment. When conducting a hazard assessment, look at each process and identify actions that could result in an injury or exposure to chemicals. Common hazards to address are unguarded machines, bad electrical cords or outlets, exposure to chemicals, and lack of the appropriate personal protective equipment. Below is a checklist with the corresponding OSHA standards; this is not an exhaustive list. If you have further questions regarding health and safety in your shop, please contact our office at 505-827-4230.

Is your process free from high levels of noise?			
Are employees wearing gloves, face shields, or other personal protection equipment?			
If employees conduct maintenance and repair on machines, do you have a lock out/tag out program?			
Do you have fire extinguishers and are employees trained in the use?			
Are machines guarded so that employees cannot get caught, pinched, or pulled into them?			
Are all belts, pulleys, and chains guarded?			
Are all electrical cords, wires, connectors, and electrical boxes maintained so that employees cannot come into contact with electricity?			
Have you made a list of all hazardous chemicals in the work place? This includes the pre-spotting agents and any other chemicals used.			
Have employees been trained in the use of these chemicals?			
Do you have material safety data sheets, or MSDS, for each chemical on the premises?			
Have you written a hazard communication program for employees who use chemicals?			

Note: If any of the above questions that are answered with "Yes", then the condition is probably adequate. If any of the above questions are answered "NO", then re-evaluate the situation, as a violation of the standards may exist. For assistance contact:

NEW MEXICO OCCUPATIONAL HEALTH & SAFETY BUREAU
CONSULTATION PROGRAM
505-827-4230

The Consultation Program provides safety and industrial hygiene surveys of workplaces, along with evaluation of, and assistance with the establishment of safety and health programs. The program is administered by the State but is operated separately from the Enforcement Program. The services are primarily targeted to smaller businesses, both public and private. The goal is to reduce workplace injuries and illnesses by helping businesses identify workplace hazards and find effective, economical solutions for eliminating or controlling them. The service is free and there are no penalties or fines, even if problems are found. Participation in this voluntary program has helped many New Mexico Businesses lower their costs associated with worker's compensation claims and increase their efficiency and productivity.

OSHA CONSULTATION/TECHNICAL SERVICES

FREQUENTLY ASKED QUESTIONS

What is the Consultation Service all about?

The Consultation program provides safety and industrial hygiene surveys of workplaces, along with evaluation of, and assistance with establishment of safety and health programs. Although the service was established by the same Act that created the Occupational Safety and Health Administration, and the associated enforcement/compliance agencies on the federal and state level, the Consultation Service does not issue fines or penalties. Since the same regulations are covered, the service allows the employer to benefit from the professional assistance, without fines being imposed.

What does your service cost and who is eligible?

The Occupational Health & Safety Bureau (OHSB) offers consultation services free of charge to New Mexico employers with 250 or less employees on location or 500 statewide. Limited services are available to larger companies. Consultation is offered only at the request of an employer.

What types of places do you visit?

The extent of the OSHA Act is to protect employees in all places of work. These include machine shops, hospitals, offices, chemical manufacturing plants etc. The consultation program is designed to assist employers (especially small employers) in complying with the requirements of OSHA regulations. We therefore, visit any place of employment that has employees.

Where does the Consultation Service get its funding?

The program receives funding from both the federal and the state government.

How long does the consultation process take?

Depending on the size of the company and the scope of the visit, a consultation may take anywhere from one or two hours to a full day. If exposure monitoring is requested or recommended, another day is often scheduled.

What kinds of things do you look at?

In order to evaluate the systems in place, sufficient information from the employer may be needed. This would include assessing existing safety and health programs, the OSHA 200 logs, accident investigation reports, and a walk-through of the facility to identify potential injury and illness hazards in the workplace.

Do we have to let you in all areas?

You, the employer makes that determination. If you requested a comprehensive survey, the consultant will look at all areas.

Can it be arranged for both the safety and the industrial hygiene visits to be conducted on the same day?

Visits are scheduled based on the caseload of the consultants. Where the caseloads permit such an arrangement can be made.

Do I (the employer) have to fix everything you find?

The employer is obligated to correct all serious hazards found by the consultant, within a reasonable time frame. Time extensions are granted for abatement of hazards when needed, if the employer is providing interim protection for employees.

How are hazards classified as "serious" & "other than serious"?

A serious violation results where there is substantial probability that death or serious physical harm could result. An other than serious violation is a hazard that has a direct relationship to job safety and health, but probably would not cause death or serious physical harm.

How much will it cost to correct/fix the hazards identified?

Usually, it is not prohibitively costly to correct hazards identified by our consultants. However, where cost becomes an overriding consideration or where the employer can show that engineering controls are not feasible the employer may seek a variance from OHSB. In this case the employer must show that a combination of work practices, administrative controls, and personal protective equipment will provide equal or better protection for the employees.

Do you come back to verify hazard correction?

For regular consultation visits, a statement of assurance of correction for each hazard is usually acceptable. For special program consultations (SHARP) a follow-up visit is usually conducted to verify correction of hazards.

How do we request an extension of time on corrections?

All extensions have to be requested in writing. The letter should include the reason for the extension, what has been done to date to correct hazards; and if corrections have not been made, the employer must state what interim measures have been taken to protect the employees.

What is the SHARP Program all about?

SHARP or Safety and Health Achievement Recognition Program is one of our special programs for companies wishing to go the extra mile to establish a fully functional overall safety and health program, in addition to the correction of hazards. SHARP is primarily a recognition program for exemplary companies, but an added incentive for SHARP participants is a one-year exemption from OHSB's general schedule inspections.

Does Sharp keep OHSB enforcement out in all cases?

No, At SHARP sites, OHSB will continue to make inspections in the following situations:

- imminent danger;
- fatality/catastrophe;
- formal complaints;
- referral from other government agencies; or
- follow-up on previously cited violations.

Where can I get information on establishing written programs (i.e. blood borne pathogen, hazard communication, confined space, etc?

Many of the safety and health programs are available through the New Mexico Occupational Health & Safety Consultation Program. They are available upon request.

How do we know which elements of the safety and health program requirements need to be fixed, if it doesn't show up on your report to us?

It is addressed in the safety & health program management section of the report the employer receives. These issues are also discussed by the consultant with the employer.

Is it necessary to have a written certification of hazard assessment at work sites that do not require (PPE) Personal Protective Equipment for any task?

Yes, according to 1910.132(d)(2), the employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated.

Can you come to our company and conduct a class or safety meeting?

Onsite training and education by consultants will be based on available resources and the employers request. The training and education will be tailored to the nature of the hazards or potential hazards in each specific workplace. Training in specific areas is also available through private consultants and the New Mexico Workers Compensation Administration or your insurer.

Can the consultant come back for specific things such as checking new equipment or processes that we bring on line?

Yes, Visits for specific purposes can be requested, in addition to regular consultation visits.

May I call your office anytime to ask questions?

Consultants are available to answer questions between 7-5pm Monday-Friday

Can anyone gain access to my report?

No, our files are confidential and are destroyed after 3 years.

Will a consultation visit lead to an inspection by OSHA compliance? Will your findings be passed on them?

All information is kept confidential. OHSB compliance inspectors cannot discover where we have been and then inspect those companies. The only time enforcement is contacted, is if a company neglects to correct serious hazards beyond time extensions. Then we are obligated to refer those items to enforcement, but only after we have made every attempt to work with the company.

What determines when a compliance inspection is going to occur? How do they decide whom they are going to visit?

Factors that may trigger a compliance inspections include:

- formal complaints by employees or their authorized agents;
- fatalities;
- catastrophe or major incidents;
- history of the company (previous OSHA activity);
- referral by other governmental agencies;
- general schedule inspections; or
- special emphasis programs

Have you been or will you go to my competitor?

Our service extends to all eligible companies who request it. All information is kept confidential; therefore, no hazards, or processes that may be a trade secret, seen in your facility will be discussed in another place of business.

Where can I get a copy of the regulations?

The Government Printing Office (GPO) processes all sales and distribution of the CFR. For payment by credit card, call (202) 512-1800, M-F, 8am to 4 pm or fax your order to (202) 512-2250, 24 hours a day. For payment by check, write to the Superintendent of Documents, Attn: New Orders, PO Box 371954, Pittsburgh, PA 15250-7954. Regulations and other material are available on the Internet at www.osha.gov.

General Health and Safety Issues

YES	NO	
☐	☐	Do the employees wear respirators?
		If so,
☐	☐	Does the company have a written respiratory protection program?
☐	☐	Are employees trained to properly wear, clean/maintain, and know in what situations the respirators are needed?
		If not,
☐	☐	Is the indoor air quality such that they are not needed?
☐	☐	Is there a written Hazard Communication Program?
☐	☐	Are MSD sheets available for all the hazardous chemicals in the workplace and are they updated regularly?
☐	☐	Have employees received Hazard Communication training?
☐	☐	Are there elevated storage/equipment lofts or platforms present?
		If so,

☐ ☐ Are signs showing the weight capacity present?

☐ ☐ If the floors are more than 4 feet above a lower floor, are guardrails present?

☐ ☐ Are all exits marked with signs?

☐ ☐ Are exit doors free to access and are routes to these exits kept free of obstructions?

☐ ☐ Is there a procedure in place for obtaining medical treatment for injured employees?

☐ ☐ Are there first aid supplies readily available?

☐ ☐ Are there fire extinguishers on site?

☐ ☐ Are they charged and ready for use?

☐ ☐ Are employees required to use these extinguishers?

If yes,

☐ ☐ Is the path unobstructed?

YES NO

☐ ☐ Are they subjected to an annual inspection?

☐ ☐ Are employees trained to use them?

If not,

☐ ☐ Is there a written policy that requires employee evacuation?

☐ ☐ Does the company have an emergency action plan and fire prevention plan?

☐ ☐ Has the electrical system throughout the facility been assessed for situations where an employee may come into contact with an electrical current, or the electrical system is such that a fire hazard exists (i.e. bare conductors, faulty equipment, exposed electrical equipment where a flammable/explosive environment may exist)?

☐ ☐ Does the employer (if 10+ employees are employed) record occupational injuries and illnesses on the OSHA-200 log?

OSHA Auto Repair Shop Safety Checklist

Yes No

Walking Working Surfaces

☐ ☐ Are all aisles and walkways 22” or wider?
☐ ☐ Are permanent aisles marked and maintained free of obstructions?
☐ ☐ Are spills and slick areas cleaned up?

Hand Tools

☐ ☐ Are tools clean and in good condition?
☐ ☐ Are chisels and punches without mushroomed heads?
☐ ☐ Are wood hammer handles without cracks or splits?

Power Tools

☐ ☐ Are right angle grinders equipped with half moon guards?
☐ ☐ Is hearing protection worn when using impact tools?
☐ ☐ Are electric tools double insulated or grounded?
☐ ☐ Are bench grinder tools rests (1/4”) and top tongue guards (1/8”) adjusted?

Machinery

☐ ☐ Are all guards in place?
☐ ☐ Is machinery used according to manufacturers instructions?
☐ ☐ Does air compressor have Lock –out/Tag-out procedure? Locks and Tags?
☐ ☐ Are car hoists and lifts inspected annually by experts?
☐ ☐ Are overhead hoists and engine hoists inspected (internally) annually?
☐ ☐ Are air nozzles restricted to 30 psi or less?

Flammables

☐ ☐ Are flammables (<25 gallons) stored in approved cabinets?
☐ ☐ Are fire extinguishers available for types of flammables?
☐ ☐ Are spray paint operations performed inside spray booth or area?
☐ ☐ Are torches more than 20 feet from other flammables?
☐ ☐ Are torches more than 20 feet from other spare bottles, including empties?

Yes No

Personal Protective Equipment

☐ ☐ Is hearing protection provided and are employees trained on use and limitations?
☐ ☐ Is a Chemical Hazard Communication Program in place?
☐ ☐ Is personal protective equipment used?
☐ ☐ Is a written Personal Protective Equipment program in place?

Electrical

☐ ☐ Are all cords in good condition?
☐ ☐ Is strain relief provided for cord connections to tools or junction boxes?
☐ ☐ Is conduit used for permanent wiring?
☐ ☐ Are all outlets grounded?
☐ ☐ Are all areas within 6 feet of wet or potentially wet surfaces protected by GFCI?

Safety and Health Program (recommended)

☐ ☐ Is a Job Hazard Analysis written for hazardous jobs?
☐ ☐ Is training provided for Job Hazard Analysis tasks?
☐ ☐ Are safe behaviors observations conducted?
☐ ☐ Is there management commitment to the safety program?
☐ ☐ Are employees involved in a safety program?
☐ ☐ Is the safety program evaluated periodically?

Note: If any of the above questions that are answered with "Yes", then the condition is probably adequate. If any of the above questions are answered "NO", then re-evaluate the situation, as a violation of the standards may exist. For assistance contact:

NEW MEXICO OCCUPATIONAL HEALTH & SAFETY BUREAU
CONSULTATION PROGRAM
505-827-4230

The Consultation Program provides safety and industrial hygiene surveys of workplaces, along with evaluation of, and assistance with the establishment of safety and health programs. The program is administered by the State but is operated separately from the Enforcement Program. The services are primarily targeted to smaller businesses, both public and private. The goal is to reduce workplace injuries and illnesses by helping businesses identify workplace hazards and find effective, economical solutions for eliminating or controlling them. The service is free and there are no penalties or fines, even if problems are found. Participation in this voluntary program has helped many New Mexico Businesses lower their costs associated with worker's compensation claims and increase their efficiency and productivity.